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THE

JOURNAL

OF THE

ROYAL GEOGRAPHICAL SOCIETY.

VOLUME THE THIRTY-SEVENTH.



1867.

EDITED BY THE ASSISTANT-SECRETARY.

LONDON:

JOHN MURRAY, ALBEMARLE STREET.

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LONDON: PRINTED BY W. CLOWES AND SONS, DUKE STREET, STAMFORD STREET,
AND CHARING CROSS.

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Royal Geographical Society.

1867.

REPORT OF THE COUNCIL,

READ AT THE ANNIVERSARY MEETING ON THE 27TH MAY.

THE Council have the pleasure of submitting the following Report of the financial state of the Society, and its general progress since the last Anniversary Meeting.

Members.—Since the last Report 147 Fellows have been elected, of whom 3 were Honorary Corresponding, and 19 have paid their Life Compositions. The number lost by death is 43, and by resignation 33.

In pursuance of the notice given in the last year's Report, and under the direction of the Finance Committee, the rule has been put in force with regard to Fellows whose subscriptions were three years and upwards in arrear; 45 names have thus been struck off the list, the accumulation of several years.

Finances.—The annexed Balance-sheet (A) shows a continuance of the financial prosperity of the Society, and compares favourably with those of previous years. It will be seen that the receipts for the year 1866 (exclusive of balance in hand) were 5085*l.* 8*s.* 3*d.*; in 1865 the amount was 4905*l.* 8*s.* 3*d.*; and in 1864, 4977*l.* 8*s.* 6*d.* The expenditure during the past year was 4052*l.* 15*s.*; in 1865 it was 4307*l.* 4*s.* 5*d.*; and in 1864, 3647*l.* 7*s.* 10*d.* Of the amount expended, 272*l.* 1*s.* 6*d.* were for the promotion of expeditions, the details of which are given

in the Balance-sheet. The excess of income over expenditure during the past year was 1032*l.* 13*s.* 3*d.*; and this has enabled the Finance Committee, on the approval of the Council, to add 1000*l.* to the funded property, purchasing India 5 per Cent. Stock to that amount, at the cost of 1028*l.* 15*s.* It may be well to state that since the end of the financial year, December 31st, 1866, 1000*l.* more have been invested in India 5 per Cent. Debentures. The total amount of the funded capital of the Society at the present date is 14,500*l.*

The legacy of 4000*l.* mentioned in the last Report as having been bequeathed to the Society by the late Benjamin Oliveira, Esq., is still under litigation. As before stated, the Council were recommended by their legal advisers to appear in the suit as defendants, the bill being filed in Chancery by members of the family, who set up a prior settlement of Mr. Oliveira. It is hoped that by the next anniversary the Council may be able to announce the conclusion of the suit with results satisfactory to the Society.

The system of monthly examination of the expenditure and accounts by the Finance Committee has been continued throughout the year, and all bills due by the Society have been paid at the next Monthly Meeting following their presentation. The accounts have also been examined by the Auditors to the end of the year 1866.

STATEMENT showing the RECEIPTS and EXPENDITURE of the Society from the Year 1848 to the 31st Dec. 1866.

Year.	Cash Receipts within the Year.			Cash Amounts invested in Funds.			Deducting Amounts invested in Funds; actual Expenditure.		
	£.	s.	d.	£.	s.	d.	£.	s.	d.
1848	696	10	5	..	..		755	6	1
1849	778	3	0	..	..		1098	7	6
1850	1036	10	5	..	..		877	2	10
1851	1056	11	8	..	..		906	14	7
1852	1220	3	4	..	..		995	13	1
1853	1917	2	6	..	..		1675	6	0
1854	2565	7	8	..	..		2197	19	3
1855	2584	7	0	..	..		2636	3	1
1856	3372	5	1	533	10	0	2814	8	1
1857	3142	13	4	378	0	0	3480	19	9
1858	3089	15	1	..	..		2944	13	6
1859	3471	11	8	950	0	0	3423	3	9
1860	6449	12	1	466	17	6	5406	3	7
1861	4792	12	9	1358	2	6	3074	7	4
1862	4659	7	9	1389	7	6	3095	19	4
1863	5256	9	3	1837	10	0	3655	4	0
1864	4977	8	6	1796	5	0	3647	7	10
1865	4905	8	3	1041	5	0	4307	4	5
1866	5085	8	3	1028	15	0	4052	15	0

In 1856 a Treasury Grant of 1000*l.* for the East African Expedition received.

In 1860 a Treasury Grant of 2500*l.* for the East African Expedition received.

STATEMENT showing the Progress of the INVESTMENTS of the Society from the Year 1832 to the 31st Dec. 1866.

End of the Year, Dec. 31.	Cash invested.			Amount of Stock purchased.		
	£.	s.	d.	£.	s.	d.
1832	3657	10	0	4000	0	0
1833	4130	0	0	4500	0	0
1834	4426	0	0	4800	0	0
1835	4426	0	0	4800	0	0
1836	4426	0	0	4800	0	0
1837	4426	0	0	4800	0	0
1838	4426	0	0	4800	0	0
1839	4129	15	0	4500	0	0
1840	3788	10	0	4150	0	0
1841	2801	0	0	3150	0	0
1842	2801	0	0	3150	0	0
1843	2219	18	6	2578	4	4
1844	2219	18	6	2578	4	4
1845	2219	18	6	2578	4	4
1846	1933	1	0	2278	4	4
1847	2133	1	0	2502	6	2
1848	1886	16	8	2224	1	10
1849	1886	16	8	2224	1	10
1850	1886	16	8	2224	1	10
1851	1886	16	8	2224	1	10
1852	1886	16	8	2224	1	10
1853	1662	14	10	2000	0	0
1854	1662	14	10	2000	0	0
1855	1662	14	10	2000	0	0
1856	2216	4	10	2600	0	0
1857	2594	4	10	3000	0	0
1858	2594	4	10	3000	0	0
1859	3544	4	10	4000	0	0
1860	4011	2	4	4500	0	0
1861	5369	4	10	6000	0	0
1862	6758	12	4	7500	0	0
1863	8596	2	4	9500	0	0
1864	10365	7	4	11500	0	0
1865	11406	12	4	12500	0	0
1866	12435	7	4	13500	0	0*

* Of which 2000*l.* is India 5 per Cents.

Publications.—The 36th volume of the Journal was published at the end of April last, and is now being delivered, as usual, to all Fellows who apply for their copies at the offices of the Society in Whitehall Place. The volume contains 21 Memoirs and 14 Maps, and it is hoped will bear comparison for the varied interest of its contents with those of preceding years.

The 10th volume of the Proceedings has also been published

and delivered to Fellows during the year, and two parts of the 11th volume, containing the Reports of Meetings of the present Session have been distributed.

The Index to the third ten volumes of the Society's Journal, mentioned in a previous Report as in process of compilation by Colonel H. Yule, has been finished, and the manuscript presented to the Council, during the present Session. It is now being printed, and copies will be ready for distribution during the summer. The Council have tendered, on behalf of the Society, their sincere thanks to Colonel Yule for this laborious and skilful compilation, made by him gratuitously and in the desire to be useful to students of the Society's publications.

It is satisfactory to have again to report an increase in the sale of publications, the amount during the past year being 128*l.* 13*s.* 7*d.* In the year 1865 the total sales were 124*l.* 4*s.* 4*d.*; in 1864, 105*l.* 12*s.* 7*d.*; and in 1863, 65*l.* 8*s.* 8*d.*

Library.—Since the last Report 1068 volumes of books and pamphlets have been added to the Library, 36 by purchase and the remainder presented or received in exchange for our own publications.

The Council have to report that since the last anniversary they have appointed to the office of Librarian Mr. J. H. L. Lamprey, a gentleman of literary attainments, the duties of the post having been previously fulfilled by a junior clerk only. Under the direction of the Library Committee, the arrangement of the books on the shelves, in the order of countries and subjects, has been nearly completed, and Mr. Lamprey is now proceeding with the Classified Catalogue of the Library, with the Geographical portion arranged alphabetically according to places, which will be of great service, when finished, as an index to the mass of Geographical literature in the possession of the Society. It may be added that the Library is much more frequented than formerly by Fellows for the purpose of Geographical research.

Map-Collection.—The accessions to the Map Department have exceeded in amount those of last year, the number of sheets of Maps and Charts added being 2426, of Atlases 8, and Diagrams and Views 37. All have been mounted, catalogued, and incorporated with the classified collection.

The following are the most important additions:—

2008 Sheets of the Ordnance Survey of Great Britain and Ireland. Presented by the Topographical Office through Sir Henry James, Director of the Survey.

90 Admiralty Charts. Presented by the Admiralty through the Hydrographer, Captain Richards.

Atlases of the World and for Schools; chromolithographed. Presented by the Author, Dr. H. Lange.

Maps of the late War in Germany. Presented by Colonel Beauchamp Walker, H.M.'s Military Commissioner in Berlin.

6 Geographical Maps of Saxony and Rhenish Prussia. Presented by the Prussian Government.

9 Sheets of Dufour's Corrected Atlas of Switzerland. Presented by the Federal Government.

New Map of Central Asia. By Lieut.-Colonel Walker.

8 Maps of the Punjab. By Lieut.-Colonel D. R. Robinson.

2 Irrigation Maps of the Madras Presidency, and Maps of the Neilgherries. Presented by C. R. Markham, Esq.

Chinese Map of China on 64 sheets. Presented by Dr. Jones Lamprey.

Official Map of Pekin. Presented by Messrs. Kopsch and Taintor.

Library Map of Africa, by Dr. A. Keith Johnston. Presented by E. Stanford, Esq.

Maps of Paraguay and the Argentine Republic. Presented by Mr. Consul Hutchinson.

Photographs of the Volcanic Eruption at Santorin. Presented by Commander Lindesay Brine.

Large Diagrams.—The Special Committee of Council, consisting of Vice-Admiral Sir George Back, Rear-Admiral R. Collinson, Major-General G. Balfour, and the Secretaries, have continued during the year their superintendence of the construction of large Diagrams for illustrating Papers read at the evening Meetings of the Society. The Diagrams have all been drawn up on the Mercator projection, as decided by the Council on the Report of General Sir Andrew Scott Waugh, late Superintendent of the Great Trigonometrical Survey of India, this projection being the only one on which routes of travellers,

with correct bearings, can be drawn. The Diagrams of Asia and America were finished and exhibited early in the Session, and the Council have now the satisfaction to report the completion of the other two, namely, the Malay Archipelago and the World, the former of which is on a scale of 6 inches, and the latter of 0·66 in. to an equatorial degree.

Catalogue of Maps.—Considerable progress has been made during the past year in cataloguing the valuable collection of Maps which the Society possesses; and, under the direction of the Special Committee above named, the Curator, with an extra assistant, has made a complete list in MS. of all the Maps—giving the title, scale, date and limits of each. In future this will much facilitate the finding of any Map to which a visitor may wish to refer. The Catalogue does not at present include charts, diagrams, models, and views, and is classified according to countries and places. An additional Catalogue might hereafter be made, in alphabetical order, of places represented, with the press mark of the Curator's list, and such simpler form of Catalogue might eventually be printed for the use of Fellows.

Grants to Travellers.—A sum of 200*l.* was voted during the year to the Leichhardt Search Fund in Australia, and a further sum of 50*l.* to M. Gérhard Rohlfs, who, when last heard of, was about to leave the shores of Lake Tshad for Waday. A set of instruments were provided, at the cost of 22*l.* 1*s.* 6*d.*, for Mr. E. Whymper, who has lately left England to explore Greenland. Instruments have also been lent to Mr. Henry Whitely, a traveller who is now on his way to explore the eastern slopes of the Andes, in Southern Peru.

APPENDIX A.

BALANCE-SHEET FOR THE YEAR 1866.

Receipts.

	£.	s.	d.	£.	s.	d.
Balance in Banker's hands 31st Dec., 1865	86	15	3			
Ditto Accountant's Ditto	12	9	7			
				99	4	10
Subscriptions of 1243 Fellows	2623	13	0			
Entrance Fees of 141 Fellows	423	0	0			
Life Compositions of 24 Fellows	595	0	0			
Arrears of Subscriptions	194	0	0			
				3835	13	0
Parliamentary Grant				500	0	0
Royal Premium (1865 and 1866)				105	0	0
Sale of Publications				128	13	7
Advertisements				90	14	9
Rent of Stables				10	0	0
Half Year's Dividend on 1000*l.* India 5 per Cents.	24	11	8			
Half Year's Dividend on 11,500*l.* New 3 per Cents.	169	12	6			
Half Year's Dividend on 2000*l.* India 5 per Cents.	49	3	4			
Half Year's Dividend on 11,500*l.* New 3 per Cents.	169	12	6			
				413	0	0
Sundry small receipts				2	6	11
				£5184	13	1

Expenditure.

	£.	s.	d.	£.	s.	d.
Rent, Taxes, and House Expenses				443	12	8
Salaries and Wages				1213	15	6
Library and Map-Rooms				113	1	9
Subscriptions, &c., returned				47	0	0
Gold Medals, and other awards				177	5	0
Postages, &c.				131	19	3
Office Expenses				283	9	6
Publications and Illustrations				1230	10	1
Furniture and Repairs				111	0	3
Expeditions:						
Contribution towards M. Gérhard Rohlfs' Expedition	50	0	0			
„ „ Leichhardt Search Expedition	200	0	0			
„ „ Mr. Whymper's Expedition (Instruments)	22	1	6			
				272	1	6
Miscellaneous				28	19	6
				4052	15	0
Addition to Funded Property (1000*l.* India 5 per Cents.				1028	15	0
Balance in Banker's hands	87	15	1			
Ditto Accountant's „	15	8	0			
				103	3	1
				£5184	13	1

Audited 17th April, 1867.

REGINALD T. COCKS, *Treasurer.*

THOMAS H. BROOKING,
G. BALFOUR,
CHARLES WHITE,
H. JONES WILLIAMS,
Auditors.

APPENDIX B.

ESTIMATE FOR THE YEAR 1867.

Receipts.

	£.	s.	d.
Cash Balance, 1st Jan., 1867	103	3	1
Annual Subscriptions	2600	0	0
Life Compositions	450	0	0
Entrance Fees	390	0	0
Arrears of Subscriptions	150	0	0
Royal Premium for 1867	52	10	0
Parliamentary Grant	500	0	0
Sale of Publications	125	0	0
Dividends and Small Receipts	480	0	0
	£4850	13	1

Expenditure.

	£.	s.	d.
Rent, Taxes, and House Expenses	550	0	0
Salaries (whole Staff) and Wages	1250	0	0
Library and Map-Rooms	250	0	0
Gold Medals	46	0	0
Postages, &c.	130	0	0
Office Expenses	250	0	0
Journal, with Maps, and Proceedings	1000	0	0
Index to third ten vols. of the Society's Journal	200	0	0
EXPEDITIONS:—			
Contribution to M. Gérhard Rohlfs' Expedition	50	0	0
,, Livingstone Search do.	200	0	0
	250	0	0
	3926	0	0
Balance available for investment	924	13	1
	£4850	13	1

Library Regulations.

I. The Library will be open every day in the week (Sundays excepted) from 10·30 in the morning to 4·30 in the afternoon,* except on New-Year's Day, Good Friday to Easter Monday inclusive, and Christmas week; and it will be closed one month in the year, in order to be thoroughly cleaned, viz. from the first to the last day of September.

II. Every Fellow of the Society is entitled (*subject to the Rules*) to borrow as many as four volumes at one time.

Exceptions :—

1. Dictionaries, Encyclopædias, and other works of reference and cost, Minute Books, Manuscripts, Atlases, Books and Illustrations in loose sheets, Drawings, Prints, and unbound Numbers of Periodical Works, *unless with the special written order of the President.*
2. Maps or Charts, *unless by special sanction of the President and Council.*
3. New Works before the expiration of a month after reception.

III. The title of every Book, Pamphlet, Map, or Work of any kind lent, shall first be entered in the Library-register, with the borrower's signature, or accompanied by a separate note in his hand.

IV. No work of any kind can be retained longer than one month: but at the expiration of that period, or sooner, the same must be returned free of expense, and may then, upon *re-entry*, be again borrowed, provided that no application shall have been made in the mean time by any other Fellow.

V. In all cases a list of the Books, &c., or other property of the Society, in the possession of any Fellow, shall be sent in to the Secretary *on or before the 1st of July in each year.*

VI. In every case of loss or damage to any volume, or other property of the Society, the borrower shall make good the same.

VII. No stranger can be admitted to the Library except by the introduction of a Fellow, whose name, together with that of the Visitor, shall be inserted in a book kept for that purpose.

VIII. Fellows transgressing any of the above Regulations will be reported by the Secretary to the Council, who will take such steps as the case may require.

By Order of the Council.

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* On Saturday the Library is closed at 2·30 P.M.

ROYAL GEOGRAPHICAL SOCIETY.

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Vice-Patron.

H.R.H. THE PRINCE OF WALES.

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1868.

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KHANIKOF, M. .. .. Paris
KIEPERT, Dr. H. .. .. Berlin
LEAL, His Exc. Senhor Fernando da Costa, Governor of Mossamedes, Benguela West Africa
LEAL, José da Silva Mendes, Minister of the Colonies .. .. Lisbon
LINANT Pasha .. .. .. Alexandria
LIVINGSTONE, David, Esq., M.D., LL.D.
LÜTKE, Admiral F. B., Pres. of the Imp. Academy of Sciences .. St. Petersburg
MACEDO, J. J. da Costa de .. .. Lisbon
MADOZ, Don Pascual .. .. .. Madrid
MALTE-BRUN, M. V. A., Sec. Geogr. Soc. of .. .. Paris
MARTIUS, Dr. Charles von .. .. Munich
MAURY, Commodore M. F.
NARDI, Monsignor Francesco .. Rome
NEGRI, Chevalier Cristoforo .. .. Turin
PETERMANN, Dr. Augustus .. .. Gotha
PHILIPPI, Dr. Rodulfo Armando .. Chili
PLATEN, His Excellency Count.

RAIMONDY, Don Antonio.. .. .. Lima
RANUZZI, Count Annibale .. .. Bologna
RÜPPELL, Dr. E., For. M.L.S... Frankfort
SALAS, Don Saturnino, Pres. Topo. Depart., Argentine Repub. .. .. Buenos Ayres
SCHEDA, Herr von, Director of the Imp. Inst. of Military Geogr. .. .. Vienna
SCHERZER, Dr. Karl von .. .. Vienna
SOLDAN, Don Marino Felipe Paz, Lima, and 21A, Hanover-square, W.
SONKLAR, Lieut.-Col. the Chev. de, Wiener, Neustadt, Vienna
STRUVE, Prof. Otto, Imp. Observ. of Pulkowa .. .. .. St. Petersburg
SYDOW, Lt.-Col., Emil von (Chief of the Geographical Department of the Staff of the Prussian Army), Behren Strasse, 66, Berlin
TCHIHATCHEF, M. Pierre de .. Paris
TSCHUDI, Herr T. T. von .. .. Vienna
VANDER MAELEN, Mr. Ph. .. Brussels
VERNEUIL, M. E. de .. .. .. Paris
VILLAVICENCIO, Don Manuel Guayaquil
WRANGELL, Admiral Baron, St. Petersburg
ZIEGLER, M. J. M. .. .. Winterthur

FELLOWS.

(To 11th January, 1868.)

N.B.—*Those having * preceding their names have compounded for life.*

Year of Election.	
1863	Abdy, Rev. Albert, M.A. *Worcester Coll., Oxford; and Streatham.*
1860	À Beckett, Arthur M., Esq., F.R.C.S.E.
1851	Abinger, W. F. Scarlett, Lord. *Guard's Club, S.W.*
1865	Acheson, Frederick, Esq., C.E. 7, *College-hill, Highbury-park, North, N.*
1861	Acland, J. Barton Arundel, Esq. *Mount Peel, Canterbury, New Zealand. Care of A. Mills, Esq.*, 34, *Hyde-park-gardens, W.*
1853	Acland, Sir Peregrine Palmer F. P., Bart. *Fairfield, Somerset.*
1830	*Acland, Sir Thomas Dyke, Bart., F.R.S. 34, *Hyde-park-gardens, W.; and Killerton, Exeter, Devon.*
1867	Adair, Col. Alex. Shafto. 7, *Audley-square, W.*
1867	Adare, Viscount. *Clearwell-court, Coleford, Gloucestershire.*
1861	Addington, Right Hon. H. U. 78, *Eaton-place, S.W.*
1862	Addison, Col. Thomas, C.B.
1859	Ainslie, Col. H. Francis. *Junior United Service Club, S.W.; and Burlington-chambers*, 180, *Piccadilly, W.*
1830	*Ainsworth, W. Francis, Esq., F.S.A. *Ravenscourt-villa, New-road, Hammersmith, W.*
1859	Airlie, David Graham, Earl of. *Holly-lodge, Kensington, W.*
1860	Aitchison, David, Esq. 180, *Piccadilly, W.*
1830	*Albemarle, George Thomas, Earl of. 11, *Grosvenor-square, W.; Quiddenham-hall, Larlingford, Norfolk; and Elvedon-hall, Suffolk.*
1862	Alcock, Sir Rutherford, K.C.B. *Athenæum Club, S.W.*
1838	*Aldam, William, Esq. *Frickley-hall, near Doncaster.*
1865	Aldom, Joseph R. Esq., M.A., PH. DR. *Salway-house, Leyton, Essex.*
1857	Aldrich, Captain Robert D., R.N. *Windmill-road, Croydon, Surrey, S.*
1830	Alexander, Colonel Sir Jas. Ed., K.C.L.S., F.R.A.S., F.R.S.E., etc., 14th Regt. *United Service Club, S.W.; and Westerton-house, Bridge of Allan, N.B.*
1864	Allan, C. H., Esq. *Lloyd's, E.C.; and* 31, *Park-street, Stoke Newington, N.*
1857	Allan, G. W., Esq. *Moss Park, Toronto, Canada.*
1858	Allan, Jas., Esq. 122, *Leadenhall-street, E.C.*
1867	Allen, Alderman Wm. F. (Lord Mayor of London). *Mansion-house, E.C.*

Year of Election.		
1865		Allen, James Pearce, Esq. 13, *Waterloo-place, S.W.*
1854		Ancona, J. S., Esq. 8, *John-street, Adelphi, W.C.*
1860		Anderdon, John Edmund, Esq. *Henlade House, Taunton, Somerset.*
1863		Anderson, Arthur, Esq. *Norwood-grove, Norwood, S.*
1867	30	Anderson, Sir Henry L., K.C.B. *India-office, S.W.*
1862		Anderson, James, Esq. 1, *Billiter-court, City, E.C.*
1861		Anderson, John, Esq. Messrs. W. R. Adamson and Co. *Shanghai. Care of Messrs. Jno. Burd and Co., Hong Kong. Per Messrs. Adam, Thomson, and Co.*, 48, *Lime-street, E.C.*
1861		*Anderson, Col. W., C.B. 19, *Gloucester-square, Hyde-park, W.*
1856		*Andrew, William P., Esq.
1867		Andrews, G. H., Esq. *The Cedars, New Brentford.*
1866		Andrews, John R., Esq. *East-hill-house, Wimbledon, S.W.*
1861		Annesley, Col. the Hon. Hugh, M.P. 25, *Norfolk-street, Park-lane, W.*
1860		*Anson, Sir John William Hamilton, Bart. 55, *Portland-place, S.W.; and Sherley-house, Croydon.*
1853		Ansted, Prof. D. T., M.A., F.R.S., etc. 33, *Brunswick-square, W.C.; Athenæum Club, S.W.; and Bonair St. Martin, Guernsey.*
1857	40	Anstruther, M.-Gen. Philip, C.B., Madras Artil.
1864		Anstruther, Lieut. R. L., Rifle Brigade. *Montreal, Canada. Care of Lt.-Col. L. Anstruther, Hintlesham-hall, Ipswich.*
1830		*Antrobus, Sir Edmund, Bart. 146, *Piccadilly, W.; Lower Cheam, Epsom, Surrey; and Amesbury, Wilts.*
1863		Arber, Edward, Esq., A.K.C. *Admiralty, W.C.; Civil Service Club, S.W.*
1858		Arbuthnot, George, Esq. 23, *Hyde-park-gardens, W.*
1862		Arbuthnot, Lieut. George, R.H.A. *Cowarth, Sunningdale.*
1860		Arcedeckne, Andrew, Esq. 35, *Albemarle-street, W.*
1861		Archer, Graves Thos., Esq. 1, *Ennismore-place, Prince's-gate, S.W.*
1866		Arconati, The Marquis Giarmmartino. *Casa Prini, Pisa. Care of Mr. Bernard Quaritch*, 15, *Piccadilly, W.*
1855		*Arden, Richard Edward, Esq. *Sunbury-park, Middlesex, S.W.*
1858	50	*Armistead, Rev. Charles John, M.A., F.S.A. *University Club, S.W.; National Club, S.W.; and Withcall-rectory, near Louth, Lincolnshire.*
1867		Armitstead, Geo., Esq. *Errol Park, Errol, N.B.*
1863		Armitage, Edward, Esq. 3, *Hall-road, St. John's-wood, N.W.*
1857		Armstrong, Alexander, Esq., M.D., R.N., F.R.C.P., Deputy Inspector-General, Royal Melville Hospital, Chatham. *Junior United Service Club, S.W.*
1866		Arran, Philip York, Earl of. *Pavilion-house, Hans-place, Sloane-street, S.W and Saunder's-court, Wexford, Ireland.*
1830		*Arrowsmith, John, Esq., F.R.A.S. 35, *Hereford-square, Old Brompton, S.W.*
1864		Arthur, John, Esq. 9, *Notting-hill-square, W.*
1863		Arthur, Captain William, R.N. *The Priory, Leatherhead.*
1858		Ashburton, Lord. *Bath-house, Piccadilly, W.*
1864		*Ashton, R. J. Esq. *Hatton-court, Threadneedle-street, E.C.*
1853	60	*Ashwell, James, Esq., M.A., F.G.S.

Year of Election.

1851 Astley, Francis D. P., Esq., M.R.I. 67, *Eaton-square, S.W.*

1830 *Atkins, John Pelly, Esq., F.S.A. *Halsted-place, near Sevenoaks.*

1860 Attwell, Professor Henry. *Barnes, S.W.*

1859 Austen, Capt. Henry H. Godwin, 24th Foot, Trig. Survey, Panjab. *Junior United Service Club, S.W.; and Chilworth-manor, Guildford, Surrey.*

1863 Austin, John G., Esq.

1854 Ayrton, Acton S., Esq., M.P. 3, *Essex-court, Temple, E.C.*

1845 *Ayrton, Frederick, Esq.

1866 *Babington, William, Esq., 23, *Fulham-place, Maida-hill, West, W.; and Bonny River, West Coast of Africa.*

1836 *Back, Admiral Sir Geo., D.C.L., F.R.S. 109, *Gloucester-place, Portman-sq., W.*

1863 70*Backhouse, John Henry, Esq. *Darlington.*

1866 Bacon, Geo. Washington, Esq. 48, *Paternoster-row, E.C.; and* 73, *Pentonville-road.*

1864 Badger, Rev. Geo. P. 7, *Dawson-place, Bayswater, W.*

1863 Bagot, Christopher N., Esq. *Oriental Club, W.*

1862 Bagot, Capt. L. H. *Care of C. S. Bagot, Esq.*, 40, *Chancery-lane, W.C.*

1859 Bailey, L. C., Esq., Staff Commander, R.N. *Topographical Department, New-street, Spring-gardens, S.W.*

1857 Baillie, Major John, Bengal Staff Corps. 22, *Palace-gardens-terrace, Kensington, W.*

1862 Baillie, John B., Esq. *Leys-castle, Inverness.*

1861 Baillie, William Henry, Esq. 12, *Chapel-street, Belgrave-square, S.W.*

1857 Baines, Thomas, Esq., 15, *Northumberland-street, W.C.*

1861 80*Baker, John, Esq.

1862 Baker, Capt. Robert B. *Oriental Club, Hanover-square, W.*

1865 Baker, Sir Samuel White. *Hedenham-hall, Bungay, Norfolk.*

1855 Baker, Capt. Wm. T., 85th Regt. *Junior United Service Club, S.W.; and* 31, *Grosvenor-place, Bath.*

1861 Baldwin, William Charles, Esq. *Leyland-vicarage, Preston.*

1861 Balfour, David, Esq. *Balfour-castle, Kirkwall, N.B.*

1847 Balfour, M-.General George, R.A., C.B. 27, *Gordon-street, Gordon-square, W.C.; and Oriental Club, Hanover-square, W.*

1853 Balfour, John, Esq. *New South Wales; and Colinton, Queensland;* 39, *St. James'-street, S.W.*

1863 Balfour, John Osborn, Esq. 7, *The Common, Woolwich.*

1863 Balfour, William, Esq. 16, *Paragon, Ramsgate.*

1860 90 Ball, John, Esq. *Oxford and Cambridge Club, S.W.*

1863 Bamforth, Rev. J., Principal of Doveton College. *Madras. Care of Messrs. Jackson, Walford, and Hodder,* 27, *Paternoster-row, E.C.*

1852 Bancroft, Capt. W. C., 16th Regt. *Aide de Camp and Military Sec., King's House, Jamaica; M'Gregor and Co., Charles-street, S.W.*

1862 Banks, George F., Esq., Surgeon R.N.

1858 Bannerman, Sir Alexander, Bart. *Crimonmogate, Aberdeenshire.*

Year of Election.	
1840	*Barclay, Arthur Kett, Esq., F.R.S. *Park-street, Southwark, S.E.; and Bury-hill, Dorking, Surrey.*
1863	Barford, A. H., Esq., M.A. 1, *Cornwall-terrace, Regent's-park, N.W.*
1863	Baring, the Hon. Alexander, U.
1835	*Baring, John, Esq. *Oakwood, Chichester.*
1844	*Baring, Thomas, Esq., M.P. 41, *Upper Grosvenor-street, W.*
1862	100 Barlee, Frederick Palgrave, Esq. *Care of G. Laurence, Esq.*, 9, *Old Broad-street, E.C. Perth, Western Australia.*
1864	Barnett, H. C., Esq. *Care of Alex. Whytock, Esq.*, 9, *George-st., Edinburgh.*
1858	Barratt, James, Esq. *Lymne-hall, near Harrington, Cheshire.*
1859	Barrington, Lord. 19, *Hertford-street, Mayfair, W.*
1867	Barrington Ward, Marcus J., Esq. *Magdalene-hall, Oxford.*
1833	Barrow, John, Esq., F.R.S., F.S.A. 17, *Hanover-terrace, Regent's-park, N.W.*
1863	Barry, Alfred, Esq.
1857	Bartholomew, John, Esq. 4, *North-bridge, Edinburgh.*
1861	Bartlett, Herbert Lewis, Esq. *Union Club, S.W.*
1862	Barton, Alfred, Esq., M.D. *Oriental Club, W.; and Hampton Court.*
1864	110 Basevi, Capt. J. P., R.E. 100, *Belgrave-road, S.W.; Messrs. Grindlay & Co., Parliament-street, S.W.*
1837	*Bateman, James, Esq., F.R.S., L.S. *Knypersley-hall, Staffordshire.*
1859	Bateman, John F., Esq., C.E. 16, *Great George-street, Westminster, S.W.*
1866	Bates, Henry Walter, Esq., F.Z.S. 15, *Whitehall-place, S.W.*
1866	Bateson, George, Esq. 45, *Green-street, Park-lane, W.*
1866	Batten, John H., Esq. *Rosevean, Penzance; and Oriental Club, Hanover-square, W.*
1864	Bax, Capt. Henry G. 2, *Sussex-place, Hyde-park-gardens, W.*
1867	*Baxter, Sir David, Bart. *Dundee;* 5, *Moray-place, Edinburgh; and Kilmaron-castle, Cupar, Fife.*
1867	Baxter, Richard, Esq. (Barrister-at-Law). 19, *Leinster-gardens, Bayswater, W.*
1858	Baxendale, Joseph H., Esq. 14, *Chester-terrace, Regent's-park, N.W.; and Scott's-bridge, near Rickmansworth, Herts; Castle Inn, Wood-street, E.C.*
1867	120 Bayley, Chas. Jno., Esq., C.B., M.A. 51, *Victoria-road, Kensington, W.*
1863	Bayley, H. Esq. *Blackheath-park, Kent.*
1862	Bayly, Lieut.-Col. John, R.E. *Ordnance Survey Office;* 131, *St. George's-road, Pimlico, S.W.*
1862	Baynes, Lieut.-Col. R. Stuart. *Army and Navy Club, S.W.; and* 38, *Jermyn-street, S.W.*
1866	Beamish, Captain H. H., R.N. 9, *Cadogan-place, S.W.*
1852	Beardmore, Nathaniel, Esq., C.E. 30, *Great George-street, Westminster, S.W.*
1858	Beauclerk, Aubrey de Vere, Esq. *Ardglass, Co. Belfast.*
1854	Beaufort, William Morris, Esq., Bengal Civil Service. *Bengal.*
1856	Beaumont, John Aug., Esq. *Wimbledon-park-house, Wimbledon, S.W.; and* 50, *Regent-street, W.*
1851	*Beaumont, Wentworth B., Esq., M.P. 144, *Piccadilly, W.; Bywell-hall, Newcastle-upon-Tyne; and Bretton-park, Wakefield.*

Year of Election.		
1863	130	Beavan, Hugh J. C., Esq., F.A.S.L. 13, *Blandford-square, Regent's-park, N.W.; 4, Middle-temple-lane, E.C.; and Junior Carlton Club, S.W.*
1867		Beazeley, Alexander, Esq., C.E. *Engineers' Office, Trinity-house, E.C.*
1867		Beazeley, Michael, Esq., M.I.C.E. *Trinity Works, Penzance, Cornwall.*
1865		Bebb, Horatio, Esq. 13, *Gloucester-place, W.; and Leamington.*
1861		Beckett, James F., Esq., Staff Commander, R.N., F.R.S.A. 6, *Boyne-terrace, Notting-hill, W. Care of Captain George.*
1838		*Beckford, Francis L., Esq. *Ruxley-lodge, Esher, Surrey.*
1859		Bedford, Capt. G. Augustus, R.N. 5, *Ormond-terrace, Regent's-park, N.W.*
1860		Beeton, Samuel Orchart, Esq.
1861		*Begbie, James, Esq. 27, *Mark-lane, E.C.*
1860		Begbie, Thomas Stirling, Esq. 4, *Mansion-house-place, E.C.*
1846	140	Beke, Charles Tilstone, Esq., PH. DR., F.S.A., &c. *Bekesbourne-house, near Canterbury.*
1853		Belcher, Rev. Brymer. *St. Gabriel's, Pimlico, S.W.*
1830		*Belcher, Vice-Adm. Sir Edward, K.C.B., F.R.A.S. 22A, *Connaught-square, W.*
1858		Beldam, Edw., Esq. 1, *Stone-buildings, Lincoln's-inn, W.C.; and Royston, Herts.*
1863		Belmore, The Earl of. *Dover-street, Piccadilly, W.*
1863		*Bell, Charles, Esq. *Richmond.*
1858		Bell, C. Davidson, Esq., Surveyor-General, Cape of Good Hope. *Cape Town. Care of the S. A. Pub. Library, Cape Town. Per Messrs. Smith, Elder, and Co.*
1830		*Bell, James Christian C., Esq. 42, *Westbourne-terrace, W.; and* 15, *Angel-court, Throgmorton-street, E.C.*
1864		Bellamy, Edward, Esq. 10, *Duke-street, St. James's, S.W.*
1830		*Bennett, John Joseph, Esq., F.R.S. *British Museum, W.C.*
1857	150	Bennett, J. Risdon, Esq., M.D. 15, *Finsbury-square, E.C.*
1856		*Benson, Robert, Esq. 16, *Craven-hill-gardens, Bayswater, W.*
1856		*Benson, William, Esq., Barrister-at-Law. 16, *Craven-hill-gardens, Bayswater, W.*
1830		Bentham, George, Esq., Pres. L.S. 25, *Wilton-place, S.W.*
1833		Bentley, Richard, Esq. *New Burlington-street, W.*
1859		Berens, H. Hulse, Esq. *Sidcross, Foot's Cray, Kent.*
1861		Berkley, George, Esq., C.E. 24, *Great George-street, S.W.*
1865		Bernard, P. N., Esq. 8, *Finch-lane, E.C.*
1866		Berridge, F., Esq. *Winchester-house, Winchester-road, Adelaide-road, N.W.*
1856		Berry, Josiah, Esq. 16, *Regent-square, W.C.*
1863	160	Best, William, Esq. *Felpham, Sussex.*
1867		Bethune, Alexander M., Esq. *Otterburn, Hamlet-road, Upper Norwood; and* 122, *Leadenhall-street, E.C.*
1842		*Bethune, R.-Adm. C. R. Drinkwater, C.B. 4, *Cromwell-rd., South Kensington, W.*
1864		*Betts, E. L., Esq. *Preston-hall, Maidstone, Kent.*
1836		Betts, John, Esq. 115, *Strand, W.C.*
1866		Bevan, William, Esq. 8, *Cedars-road, Clapham-common, S.*
1862		Bicker-Caarten, Peter, Esq. 30, *Northumberland-place, Bayswater, W.*
1866		Bicknell, Algernon S., Esq. 37, *Onslow-square, S.W.*

Year of Election.		
1860		Bidder, G. Parker, Esq., C.E. 24, *Gt. George-st., S. W.; and Mitcham, Surrey, S.*
1865		Bidwell, Charles Toll, Esq. *Garrick Club*, 35, *King-st., Covent Garden, W.C.; and* 28, *Grosvenor-st., Eaton-sq., S. W. Care of John Bidwell, Esq., Foreign Office.*
1863	170	Bigg, Thos., Esq. *Cronstadt-house, Abbey-wood, Kent.*
1859		Bigge, Frederick W., Esq. *Debden-hall, Saffron Walden.*
1850		Bigsby, John J., Esq., M.D. 89, *Gloucester-place, Portman-square, W.*
1864		Bingham, P. Esq. *Athenæum Club, S. W.*
1858		Birch, Augustus F., Esq., M.A.
1860		Birch, H. W., Esq. 46, *Welbeck-street, Cavendish-square, W.*
1858		Birch, John William, Esq. 9D, *New Broad-st., E.C.; and* 27, *Cavendish-sq., W.*
1859		Birch, Capt. Thomas, R.N. *United Service Club, S. W.*
1862		*Birchill, Capt. B. H. H. *St. Stephen's, Bedfont, near Hounslow.*
1867		*Bischoffsheim, Henri Louis, Esq. 7, *Grafton-street, New Bond-street, W.*
1858	180	Bishop, George, Esq., F.R.A.S. *Union Club, S. W.; and The Meadows, Twickenham, S. W.*
1861		Bishop, James, Esq. 11, *Portland-place, W.*
1867		Bisson, Fredk. S. de Carteret, Esq. (Lieut. R.I.M.). 70, *Berners-street, W.*
1836		*Blaauw, William H., Esq., M.A., F.S.A., F.Z.S. *Beechlands, near Uckfield, Sussex.*
1860		*Black, Francis, Esq. 6, *North-bridge, Edinburgh.*
1867		Black, Thomas, Esq., Superintendent P. and O. Steam Navigation Company's Dockyard. *Oriental-place, Southamptom.*
1858		Blackett, Henry, Esq. 13, *Great Marlborough-street, W.*
1849		Blackie, W. Graham, Esq., PH. DR. 36, *Frederick-street, Glasgow.*
1861		*Blackney, William, Esq., R.N. *Hydrographic-office, S. W.*
1862		*Blackstone, Frederick Elliot, Esq., B.C.L. *British Museum, W.C.*
1854	190	Blaine, D. Roberton, Esq., Barrister-at-Law. 3, *Paper-buildings, Temple, E.C. and* 8, *Southwick-place, Hyde-park-square, W.*
1857		*Blake, Wollaston, Esq. 8, *Devonshire-place, W.*
1859		Blakeley, Capt. Alexr., R.A.
1857		Blakiston, Captain Thomas, R.A. 28, *Wellington-street, Woolwich, S.E.*
1830		*Blanshard, Henry, Esq., F.R.A.S.
1861		*Blanshard, Henry, Esq. 78, *Westbourne-terrace, W.; and* 53, *Chancery-lane, W.C.*
1857		Blanshard, Richard, Esq. *Fairfield, Lymington, Hants.*
1865		Blaxall, Fras. H., Esq., M.D. *Tendring, near Colchester.*
1854		Blencowe, W. Robert, Esq. *The Hook, Lewes.*
1861		Blenkin, William, Esq. *Addlestone, Surrey.*
1839	200	*Blewitt, Octavian, Esq. 4, *Adelphi-terrace, Strand, W.C.*
1864		Blore, Edward, Esq., D.C.L., F.R.S., F.S.A., &c. 4, *Manchester-square, W.*
1866		Blow, William Wootton, Esq. *Care of Mrs. Evans, Belvedere-park, North Kent.*
1861		Bloxsome, Oswald J., Esq. *Clarence-house, Bognor, Sussex.*
1837		*Blunt, Jos., Esq.
1863		*Blunt, Wilfred, Esq.
1858		Bohn, Henry G., Esq. *York-st., Covent-garden, W.C.; and North-end-house, Twickenham, S. W.*

Year of Election.

1863 Boileau, Sir John P., Bart., F.R.S. 20, *Upper Brook-street, W.*

1850 Bollaert, William, Esq. 21A, *Hanover-square, W.*

1862 Bolton, Capt. Francis John, 12th Regt. *Chatham.*

1861 Bompas, George Cox, Esq. 15, *Stanley-gardens, Kensington-park, W.*

1864 Bone, John William, Esq., B.A., F.R.S.L., F.S.S. 42, *Bedford-square, W.C.*

1861 Bonney, Charles, Esq. *Adelaide, Australia.*

1858 Bonnor, George, Esq. 49, *Pall-mall, S.W.; and* 2, *Bayswater-terr., Kensington-square, W.*

1865 Bonwick, James, Esq. *St. Kilda, Melbourne. Care of W. Beddow, Esq.*, 22, *South Audley-street, W.*

1866 Booker, Wm. Lane, Esq. *Care of F. B. Alston, Esq., Foreign Office.*

1859 Borough, Sir Edward, Bart. 4, *Nassau-street, Dublin.*

1845 *Borrer, Dawson, Esq. *Altmont Ballon, Co. Carlow, Ireland.*

1856 *Botcherby, Blackett, Esq., M.A. 48, *Brompton-row, S.W.*

1858 *Botterill, John, Esq. *Flower-bank, Burley-road, Leeds.*

1860 Boustead, John, Esq. 34, *Craven-street, Strand, W.C.*

1866 *Boutcher, Emanuel, Esq. 12, *Oxford-square, Hyde-park, W.*

1865 Bouverie, P. P., Esq. 16, *Hill-street, Berkeley-square, W.*

1855 Bovet, Charles, Esq. 135, *Camden-road, N.W.*

1867 Bowell, Wm., Esq., M.C.P. *Gate-house Grammar-school, Hereford.*

1861 *Bowen, Charles Christopher, Esq. *Christchureh, Canterbury, New Zealand. Care of A. O. Ottywell, Esq.*, 16, *Charing-eross, S.W.*

1854 *Bowen, Sir George Ferguson, K.C.M.G., M.A. *Governor of Queensland, Australia.*

1866 Bower, Anthony Maw, Esq. 8, *Roehester-road, Camden-town, N.W.*

1862 Bowie, John, Esq. *Conservative Club, S.W.*

1833 Bowles, Admiral Sir William, K.C.B. 8, *Hill-street, Berkeley-square, W.*

1856 Bowman, John, Esq. 9, *King William-street, E.C.*

1865 Bowring, John, Esq. *Larkbeore, Exeter.*

1866 Bowring, Samuel, Esq. 1, *Westbourne-park, W.*

1862 Boyce, Rev. W. B., Secretary to Wesleyan Missionary Society. 38, *Milner-square, Islington, N.; and Wesleyan Mission House, Bishopsgate-street, E.C.*

1845 *Boyd, Edward Lennox, Esq., F.S.A. 35, *Cleveland-square, Hyde-park, W.*

1865 Boyle, Frederick, Esq. *The Firs, Bebington, Cheshire.*

1856 Boyne, G. Hamilton-Russell, Viscount. 22, *Belgrave-square, S.W.; Braneepeth-eastle, Durham; and Burwarton-hall, Ludlow, Salop.*

1851 Bracebridge, Charles Holte, Esq. *Atherstone, Warwiek.*

1862 Braithwaite, Isaac, Esq. 68, *Old Broad-street, E.C.*

1863 *Bramley-Moore, John, Esq. *Langley-lodge, Gerrard's Cross, Bueks.*

1859 *Brand, James, Esq. 109, *Fenchureh-street, E.C.*

1867 Brandis, Dr. D., F.L.S. *Directer of Forests, Caleutta. Care of W. H. Allen, Esq.*, 13, *Waterloo-plaee, S.W.*

1860 Brassey, T., Esq. 4, *Great George-street, S.W.; and* 56, *Lowndes-square, S.W.*

1859 Braybrooke, Philip Watson. *Assistant Colonial Secretary, Ceylon. Messrs. Priee and Co., Craven-street.*

Year of Election.	
1861	*Brenchley, Julius, Esq. *Oxford and Cambridge Club, S.W.; and Milgate, near Maidstone, Kent.*
1846	Brereton, Rev. C. D., M.A. *Little Massingham, Rougham, Norfolk.*
1833	*Brereton, Rev. John, LL.D., F.S.A. *Bedford.*
1834	*Breton, Wm. Henry, Esq., Commd. R.N., M.R.I. 15, *Camden-crescent, Bath.*
1862	Brett, Charles, Esq. 44, *Cleveland-square, W.*
1867	Bridge, John, Esq. *Altrincham, Cheshire.*
1858	250 Bridges, Nathaniel, Esq.
1852	*Brierly, Oswald W., Esq. 8, *Lidlington-pl., Harrington-sq., Hampstead-rd., N.W.*
1865	Briggs, Major, J. P. *Linthill, Lilliesleaf, Selkirk, N.B.*
1861	*Bright, Sir Charles T., M.P., F.R.A.S. 6, *Westminster-chambers, Victoria-street, S.W; and* 69, *Lancaster-gate, W.*
1860	Bright, James, Esq., M.D. 12, *Wellington-square, Cheltenham.*
1854	Brine, Major Frederic, R.E. *Army and Navy Club, S.W.; Bengal, E. Indies. Care of Mrs. F. Brine, Edgcumbe, Torquay.*
1856	Brine, Commander Lindesay, R.N. *Army and Navy Club, S.W.; H.M.S. 'Racer,' Mediterranean.*
1861	Bristowe, Henry Fox, Esq.
1861	Broadwater, Robert, Esq. 3, *Billiter-square, Fenchurch-street, E.C.*
1864	Brodie, G. S., Esq. 27, *Pembridge-square, W.*
1861	260 Brodie, Walter, Esq. 13, *Delamere-terrace, Hyde-park, W.*
1861	Brodie, William, Esq. *Eastbourne, Sussex.*
1863	*Brodrick, George C., Esq. 32A, *Mount-street, W.*
1838	Brooke, Sir James, K.C.B., D.C.L. *Burrator, Horrabridge, S. Devon; Athenæum Club, S.W.; and Sarawak, Borneo.*
1864	*Brooke, Sir Victor A., Bart. *Colebrooke-park, Co. Fermanagh, Ireland.*
1862	Brookes, Thomas, Esq. *Mattock-lane, Ealing, W.*
1856	*Brooking, George Thomas, Esq. 25, *Sussex-gardens, Hyde-park, W.*
1856	*Brooking, Marmaduke Hart, Esq. 11, *Montagu-place, Bryanston-square, W.*
1843	*Brooking, Thomas Holdsworth, Esq. 15, *New Broad-street, City, E.C.; and* 5, *Norfolk-crescent, Hyde-park, W.*
1863	*Broughall, William, Esq. *Broadwater, Down, Tunbridge-Wells.*
1850	270 Broughton, John, Lord, G.C.B., M.A., F.R.S. 42, *Berkeley-square, W.; and Erlestoke-park, Westbury, Wilts.*
1856	*Brown, Daniel, Esq. *The Elms, Larkhall-rise, Clapham, S.*
1864	Brown, Edwin, Esq., F.G.S. *Burton-on-Trent.*
1867	Brown, Geo. H. Wilson, Esq. *Victoria, Vancouver Island, British Columbia. Care of H. C. Beeton, Esq., 5, Bow-churchyard, E.C.*
1860	Brown, James, Esq., M.P. *Rossington, Yorkshire.*
1863	Brown, Jas. P., Esq. *Rio Janeiro. Care of Mr. Chas. Williams, 25, Poultry, E.C.*
1865	*Brown, James R., Esq., F.R.S.N.A. Copenhagen. 5, *Langham-chambers, Langham-place, W.*
1867	Brown, Rev. J. C., LL.D., &c. *Haddington, Scotland.*
1861	*Brown, John Allen, Esq. *The Laurels, The Haven, Ealing, W.*
1867	Brown, Richard, Esq., C.E. 115, *Lansdowne-road, Notting-hill, W.*

Year of Election.

1867 280 Brown, Robert, Esq. 4, *Gladstone-terrace, Hope-park, Edinburgh.*

1856 *Brown, Samuel, Esq. 11, *Lombard-st., E.C.; and The Elms, Larkhall-rise, Clapham, S.*

1858 *Brown, Thomas, Esq. 8, *Hyde-park-terrace, Hyde-park, W.*

1859 Brown, William, Esq. *Loat's-road, Clapham-park, S.*

1863 Browne, H. H., Esq. 70, *Westbourne-park-villas, Harrow-rd., Paddington, W.*

1862 Browne, John Comber, Esq., Superintendent and Inspector of Government Schools. *Port Louis, Mauritius.*

1858 Browne, John H., Esq. *Port Gawler, S. Australia.*

1864 *Browne, Capt. Wade. 6, *Charles-street, Berkeley-square, W.*

1858 Browne, William J., Esq. *Port Gawler, S. Australia.*

1852 Browning, Henry, Esq. 72, *Grosvenor-street, W.; and Ampton-hall, Bury St. Edmund's.*

1856 290*Browning, Thomas, Esq. 6, *Whitehall, S.W.*

1859 Bruce, Henry Austin, Esq., M.P. *Duffryn, Aberdare, Glamorganshire.*

1863 Brunton, John, Esq., M.I.C.E., F.G.S. 37, *Kensington-park-gardens, W.*

1856 Bryant, Walter, Esq., M.D., F.R.C.S. 7, *Bathurst-street, Hyde-park-gardens, W.*

1843 *Buchan, John Hitchcock, Esq. *The Grove, Hanwell, W.*

1867 *Buccleuch, his Grace the Duke of, K.G., F.R.S. *Dalkeith Palace, near Edinburgh; and Montagu-house, Whitehall, S.W.*

1859 Buckland, Edward C., Esq. 36, *Lansdowne-road, Notting-hill, W.*

1863 Budd, J. Palmer, Esq. *Ynisydoren, near Swansea.*

1865 Buller, Sir Edward M., Bart., M.P. *Old Palace-yard, S.W.; and Dilhorn-hall, Cheadle, Staffs.*

1867 *Bulger, Capt. George Ernest, F.L.S., &c. *Care of Mr. Booth, 307, Regent-st., W.*

1863 300 Bullock, Commander Charles J., R.N. *Hydrographic-office, S.W.*

1830 *Bullock, Rear-Admiral Frederick. *Woolwich, S.E.*

1864 Bullock, W. H., Esq. *Grosvenor-hill, Wimbledon, S.W.*

1860 *Bunbury, Sir Charles James Fox, Bart.; F.R.S. *Barton-hall, Bury St. Edmund's.*

1839 Bunbury, E. H., Esq., M.A. 35, *St. James's-street, S.W.*

1863 Bundock, F., Esq. *Windham Club, S.W.; and 4, Radnor-place, Gloucester-square, W.*

1861 Burges, William, Esq. *Fethard, Co. Tipperary.*

1866 Burgess, James, Esq., M.R.A.S., Principal of Sir J. Jejeebhoy's Parsee B. Institution. *Hornby-row, Bombay. Care of T. E. Gillespie, Esq., 31, Essex-st., Strand, W.C.*

1863 Burgoyne, Capt. Hugh Talbot R.N., V.C. 8, *Gloucester-gardens, Hyde-park, W.*

1864 Burn, Robert, Esq. 5, *Clifton-place, Sussex-square, W.*

1863 310*Burns, John, Esq. 1, *Park-gardens, Glasgow; and Castle Wemyss, by Greenock, N.B.*

1861 *Burr, Higford, Esq. 23, *Eaton-place, S.W.; and Aldermanston-court, Berkshire.*

1857 Burstal, Capt. E., R.N. 6, *Park-villas, Lower Norwood, S.*

1830 *Burton, Alfred, Esq. 36, *Marina, St. Leonard's.*

1833 *Burton, Decimus, Esq., F.R.S. 14, *Spring-gardens, S.W.; and St. Leonard's-cottage, Hastings.*

Year of Election.

1859 *Burton, Capt. Richd. Fras., 18th Regt. Bombay N.I., H.B.M. Consul at Santos, Brazil. 14, *St. James's-sq., S.W.* *Care of R. Arundell, Esq., Admiralty, Somerset House, W.C.*

1858 Bury, William Coutts, Viscount, M.P. 48, *Rutland-gate, S.W.*

1861 Bush, Rev. Robert Wheler, M.A. 1 *Milner-square, Islington, N.*

1861 Butler, Charles, Esq. 13, *Sussex-square, W.*

1867 Butler, E. Dundas, Esq. *Geographical Department, British Museum, W.C.*

1867 320 *Butler, Rev. Pierce (Rector of Ulcombe). *Ulcombe Rectory, Staplehurst, Kent.*

1860 *Butler, Rev. Thomas. *Rector of Langar, Nottinghamshire.*

1862 *Buxton, Chas., Esq., M.P. 7, *Grosvenor-crescent, S.W.; and Fox-warren, Surrey.*

1858 *Buxton, Sir Thomas Fowell, Bart., M.P. *Brick-lane, N.E.*

1866 Byass, Robert B., Esq. *Melville-park, Tunbridge Wells.*

1864 Bythesea, Capt. J., R.N., V.C. 20, *Grosvenor-place, Bath.* *Care of G. J. Noel, Esq., Admiralty, S.W.*

1830 *Cabbell, B. B., Esq., M.A., F.R.S., F.S.A. 1, *Brick-court, Temple, E.C.*; 52, *Portland-place, W.; and Aldwick, Sussex.*

1866 Caldbeck, Capt. J. B. (P. and O. Sup. at Aden). 17, *West Mall, Clifton, and* 122, *Leadenhall-street, E.C.* *Care of Mrs. Caldbeck, 8, Oxford-road, Islington, N.*

1857 *Caldwell, Capt. Henry, R.N. *H.M.S. 'Mersey,' Portsmouth; and 3, Audley-square, W.*

1863 Callaghan, Thos. F., Esq. *Garrick Club, W.C.*

1863 330 Calthorpe, Lord. 33, *Grosvenor-square, W.*

1861 Calthorpe, the Hon. Augustus Gough. 33, *Grosvenor-square, W.*

1855 *Calthorpe, the Hon. F. H. Gough, M.P. 33, *Grosvenor-square, W.*

1854 Calvert, Frederic, Esq., Q.C. 5, *Tinley-street, Park-lane, W.; and* 8, *New square, Lincoln's-inn, W.C.*

1858 Cameron, Capt. Charles D. *Care of E. Hertslet, Esq., Foreign-office, S.W.*

1861 Cameron, Donald, Esq. *Auchnacarry, Invernesshire.*

1858 Cameron, Major-General Sir Duncan Alexander, R.E. C.B. *New Zealand.*

1864 Cameron, J., Esq. *Singapore.* *Care of Messrs. Smith, Elder, and Co.*

1866 Cameron, R. W., Esq. *Staten Island, New York.* *Care of Messrs. Brooks and Co., St. Peter's-chambers, Cornhill, E.C.*

1861 Campbell, Capt. Frederick, R.N. 12, *Connaught-place, Hyde-park, W.*

1866 340 Campbell, George, Esq. 16, *St. George's-road, Pimlico, S.W.; and Athenæum Club.*

1861 Campbell, James, Esq. 158, *Regent-street, W.; and Thornton Steward, York.*

1844 *Campbell, James, Esq. *Grove-house, Hendon, Middlesex; and* 8, *Park-street, Grosvenor-square, W.*

1857 Campbell, James, Esq., Surgeon R.N. *Bangkok, Siam.* *Care of Messrs. Smith, Elder, and Co.*

1834 *Campbell, James, Esq., jun. *Hampton-court-green, S.W.*

1863 Campbell, Jas. Duncan, Esq.

1857 Camps, William, Esq., M.D. 40, *Park-street, Grosvenor-square, W.*

Year of Election.

1866 Canning, Sir Samuel, C.E. *The Manor-house, Abbots Langley, nr. Watford, Herts.*
1864 Cannon, John Wm., Esq. *Castle-grove, Tuam.*
1857 Cannon, Lieut.-General R. 10, *Kensington-gardens-terrace, W.*
1853 350*Cardwell, Right Hon. Edward, M.P. 74, *Eaton-square, S.W.*
1863 *Carew, R. Russell, Esq., J.P. *Carpenders-park, Watford, Herts; and Oriental Club, W.*
1862 Cargill, John, Esq., Member of the Legislative Assembly of New Zealand and Legislative Council of Otago. *Dunedin, Otago, New Zealand.*
1863 *Cargill, Wm. W., Esq. 4, *Connaught-place, Hyde-park, W.*
1864 *Carmichael, L. M., Esq., M.A., 5th Lancers, *Canterbury. Care of H. T. Clack, Esq.*, 50, *Leicester-square, W.*
1865 *Carnegie, David, Esq. *Eastbury, by Watford, Herts.*
1863 Carnegie, Admiral, the Hon. J., R.N. *H.M.S. 'Salamander.'*
1864 Carrington, R. C., Esq. *Admiralty, S.W.*
1861 Carter, Captain Hugh Bonham, Coldstream Guards. *Guards' Club, S.W.; and* 1, *Carlisle-place, Victoria-street, S.W.*
1860 Cartwright, Capt. Henry, F.S.A. *Barbican-lodge, Gloucester.*
1857 360 Cartwright, Col. Henry, Grenadier Guards, M.P. 1, *Tilney-street, Park-street, Grosvenor-square, W.*
1860 *Carver, the Rev. Alfred J., D.D., Master of Dulwich College. *Dulwich, S.*
1858 Casella, Louis P., Esq. 23, *Hatton-garden, E.C.; and South-grove, Highgate, N.*
1860 Cave, Amos, Esq. 109, *New-road, Kennington-park, S.; and Rathbone-place, Oxford-street, W.*
1857 Cave, Capt. Laurence Trent. 23, *Lowndes-street, Belgrave-square, S.W.*
1858 Cave, Stephen, Esq., M.P. 35, *Wilton-place, S.W.*
1863 Challis, John Henry, Esq. *Reform Club, S.W.*
1865 Chambers, Charles Harcourt, Esq., M.A. 2, *Chesham-place, S.W.*
1864 Chambers, David, Esq. *Paternoster-row, E.C.*
1866 Chambers, Lieut.-Col. John (J.P., Lancashire). *Priory House, Everton, near Liverpool; and Portobello-house, Mortlake, Surrey.*
1865 370 Chambers, Wm. Thomas Hodgetts, Esq. *Chichester, Sussex; and* 5, *Osborne-villas, Stoke, Devonport.*
1858 Champion, John Francis, Esq. *High-street, Shrewsbury.*
1866 *Chandless, Wm., Esq., B.A. 1, *Gloucester-place, Portman-square, W*
1867 Chapman, James, Esq. *Cape Town, Cape of Good Hope.*
1863 *Chapman, Spencer, Esq. *Roehampton, S.W.*
1860 Charlemont, Lord. *Charlemont-house, Dublin.*
1861 Charnock, Richard Stephen, Esq., PH.D[r]., F.S.A. 8, *Gray's-inn-square, W.C.; and The Grove, Hammersmith.*
1864 Cheadle, Walter, Esq., B.A., M.D. Camb. 2, *Hyde-park-place, Cumberland-gate, W.*
1861 Cheetham, John Frederick, Esq. *Eastwood, Staleybridge.*
1855 Cheshire, Edward, Esq. *Conservative Club, S.W.*
1838 380*Chesney, Major-General Francis Rawdon, R.A., D.C.L., F.R.S. *Athenæum Club, S.W.; and Ballyardle, Down, Ireland.*

Year of Election.	
1858	Chetwode, Augustus L., Esq. 7, *Suffolk-street, Pall-mall-east, S.W.; and Chilton-house, Thame, Oxfordshire.*
1858	Childers, Hugh C. E., Esq., M.P. 17, *Prince's-gardens, W.; and Australia.*
1856	Childers, John Walbanke, Esq. *Cantley-hall, near Doncaster.*
1857	*Chimmo, Commr. William, R.N. *Hydrographic-office, S.W.*
1830	*Church, W. H., Esq.
1849	Churchill, Lord Alfred Spencer. 16, *Rutland-gate, S.W.*
1856	Churchill, Charles, Esq. *Weybridge-park, Surrey.*
1853	Clarendon, George William, Earl of, K.G., G.C.B. 1, *Grosvenor-crescent, S.W. The Grove, Watford, Herts; and Hindon, Wilts.*
1863	Clark, Lieut. Alex. J. 14, *St. James's-square, S.W.; and Eveswell-house, Maindee, Newport, Monmouthshire.*
1840	390*Clark, Sir James, Bart., M.D., F.R.S. *Bagshot-park, Surrey.*
1862	Clark, Latimer, Esq. 1, *Victoria-street, Westminster, S.W.; and Cairo.*
1865	Clark, W. H., Esq. 6, *Leinster-terrace, Hyde-park, W.*
1859	Clarke, Capt. A., R.E. *Army and Navy Club, S.W.*
1855	*Clarke, Rev. W. B., M.A. *St. Leonard's, Sydney, New South Wales. Messrs. Richardson, Cornhill.*
1859	Clarke, Rev. W. Geo., M.A. *Trinity College, Cambridge.*
1862	Claude, Eugène, Esq. 22, *Park-road, Holloway, N.*
1842	*Clavering, Sir William Aloysius, Bart., M.A. *United University Club, S.W.; Axwell-park, near Gateshead; and Greencroft, Durham.*
1863	Clay, Sir Wm., Bart. 91, *Eaton-square, S.W.*
1863	Clayton, Capt. John W., late 15th Hussars. 14, *Portman-square, W.*
1866	400 Clayton, Sir W. R. *Harleyford, Great Marlow, Bucks.*
1866	*Cleghorn, Hugh, Esq., M.D., Conservator of Forests. *Madras.*
1863	Clements, Rev. H. G. *United University Club, S.W.*
1860	Clerk, Capt. Claude. *Military Prison (Queen's Bench) Southwark, S.*
1858	Clermont, Thomas, Lord. *Ravensdale-park, Newry, Ireland.*
1845	*Cleveland, His Grace the Duke of. *Cleveland-house*, 17, *St. James's-square, S.W.*
1861	Clifford, Sir Charles. *Coldham-hall, Suffolk.*
1858	Clifford, Charles Cavendish, Esq. *House of Lords, S.W.*
1866	Clinton, Lord Edward, M.P., &c. *Army and Navy Club, S.W.*
1865	Clipperton, Robert Charles, Esq., H.B.M. Consul, Kertch. *Care of T. G. Staveley, Esq., Foreign Office, S.W.*
1856	410 Clive, Rev. Archer. *Whitfield, Hereford.*
1863	Clowes, E., Esq. *Salisbury-square, Fleet-street, E.C.*
1854	Clowes, George, Esq. *Charing-cross, S.W.; Duke-street, Stamford-street, Blackfriars, S.; and Surbiton, Surrey.*
1864	Clowes, Rev. George, B.A. *Surbiton, Surrey.*
1854	Clowes, William, Esq. 51, *Gloucester-ter., Hyde-park, W.; and Charing-cross.*
1861	Clowes, William Charles Knight, Esq., M.A. *Duke-street, Stamford-street, Blackfriars, S.; and Surbiton, Surrey.*
1852	Cobbold, John Chevalier, Esq., M.P. *Athenæum Club, S.W.; and Ipswich, Suffolk.*

Year of Election.	
1859	Cochrane, Capt. the Hon. A., R.N., C.B. *Junior United Service Club, S.W.*
1862	Cockerton, Richard, Esq. 12, *Petersham-terrace, South Kensington, W.*
1862	*Cockle, George, Esq. 77, *Onslow-square, S.W.*
1859	420 Cocks, Colonel C. Lygon, Coldstream Guards. *Treverbyn-Vean, near Liskeard.*
1865	Cocks, Major Octavius Yorke. 180, *Piccadilly, W.*
1841	*Cocks, Reginald Thistlethwayte, Esq. 43, *Charing-cross, S.W.; and* 22, *Hertford-street, May-fair, W.*
1857	Coghlan, Edward, Esq. *Training-institution, Gray's-inn-road, W.C.*
1861	Coghlan, J., Esq., Engr.-in-Chief to the Government. *Buenos Ayres. Care of Messrs. J. Fair and Co.*, 4, *East India-avenue, Leadenhall-street, E.C.*
1862	Coghlan, Major Gen. Sir William M., K.C.B., R.A. *Ramsgate, Kent.*
1865	Colchester, Reginald Charles Edward, Lord. *All Souls' College, Oxford.*
1867	Colebrook, John, Esq. 194, *Sloane-street, Chelsea, S.W.*
1841	*Colebrooke, Sir Thomas Edward, Bart., M.P., F.R.A.S. 37, *South-st., Park-lane, W.*
1834	Colebrooke, Lt.-General Sir Wm., R.A., M.G., C.B., K.H., F.R.A.S. *Datchet, near Windsor; and United Service Club, S.W.*
1854	430 Coleman, Everard Home, Esq., F.R.A.S. *Registry and Record Office, Adelaide-place, London-bridge, E.C.*
1848	Coles, Charles, jun., Esq. 86, *Great Tower-street, E.C.*
1835	*Collett, William Rickford, Esq.
1867	Collier, C. T., Esq. (Barrister of the Middle Temple). *Cedar-villa, Sutton, Surrey; and Oriental Club, W.*
1858	Collinson, Henry, Esq. 7, *Cedars-road, Clapham-common, S.*
1866	Collinson, John, Esq., C.E. 9, *Clarendon-gardens, Maida-hill, W.*
1855	Collinson, Rear-Admiral Richard, C.B. *Haven-lodge, Ealing, W.; and United Service Club, S.W.*
1866	Collison, Francis, Esq. *Hern-hill, Surrey, S.*
1864	Colnaghi, Dominic E., Esq. *Care of F. B. Alston, Esq., Foreign-office, S.W.*
1862	Colquhoun, Sir Patrick, M.A.
1866	440 Colquhoun, Sir Robert G., K.C.B. 6, *Ulster-terrace, Regent's-park, N.W.; and* 14, *Arlington-street, W.*
1861	*Colville, Charles John, Lord. 42, *Eaton-place, S.W.*
1865	Colvin, Binney J., Esq. 26, *Oxford-square, Hyde-park, W.*
1861	Combe, Thomas, Esq., M.A. *University Press, Oxford.*
1864	Commerell, Commr. J. E., R.N., V.C. *Alverbank, near Gosport.*
1864	Conder, John, Esq. *Hallbrooke-house, New Wandsworth, N.W.*
1861	Constable, Capt. Chas. Golding, I.N. 68, *Hamilton-ter., St. John's-wood, N.W.*
1859	Cooke, Lt.-Colonel A. C., R.E. *Topographical Department*, 4, *New-street, Spring-gardens, S.W.*
1863	*Cooke, E. W., Esq., A.R.A., F.R.S., F.L.S., F.G.S. *The Ferns, Kensington, W.*
1856	Cooke, John George, Esq. 47, *Mount-street, Berkeley-square, W.*
1866	450 Cooke, Rev. J. Hunt. *Gladstone, Southsea, Hants.*
1860	Cooke, Nathaniel, Esq. 5, *Ladbrooke-terrace, Notting-hill, W.*
1829	Cooke, Robt. F., Esq. 50, *Albemarle-street, W.*

Year of Election.	
1860	Cooke, William Henry, Esq., Barrister-at-Law. 4, *Elm-court, Temple, E.C.*
1830	Cooley, William Desborough, Esq. 136, *Euston-road, N.W.*
1862	Cooper, Sir Daniel. 20, *Prince's-gate, S.W.*
1856	Cooper, Lt.-Col. Edward, Grenadier Guards. 5, *Bryanston-square, W.*
1860	Cooper, Lt.-Col. Joshua H., 7th Fusiliers. *Dunboden, Mullingar.*
1853	Coote, Charles Chidley, Esq. *C4, Albany, W.; and Mount-Coote, Limerick, Ireland.*
1857	*Coote, Captain Robert, R.N. *Shales, Bittern, Southampton.*
1862	460 Cope, Walter, late H.M.'s Chargé d'Affaires at the Equador. 14, *The Terrace, Camberwell, S.*
1853	Copley, Sir Joseph William, Bart. *Sprotborough, Doncaster.*
1864	Cork and Orrery, Earl of. 1, *Grafton-street, W.*
1865	Cornthwaite, Rev. T., M.A. *Forest, Walthamstow.*
1860	Cornwell, James, Esq., PH. DR. *Loughborough-park-villa, Brixton, S.*
1839	*Corrance, Frederick, Esq. *Parkham-hall, Wickham Market, Suffolk.*
1856	Costerton, John C., Esq. *Canton.*
1853	*Cosway, William Halliday, Esq. *Oxford and Cambridge Club, S.W.*
1863	Courtenay, L. W., Esq. *British Post-office, Constantinople. Care of R. Wood, Esq.*, 139, *Fleet-street.*
1865	Cowan, John E., Esq. 58, *Denbigh-street, S.W.*
1862	470 Coward, William, Esq. 5, *Park-villas, Lower Norwood, S.*
1857	*Cowell, Major Sir J. C., K.C.B., R.E. *Buckingham-palace, S.W.*
1854	Cowley, Norman, Esq. 4, *Montagu-place, Montagu-square, W.*
1862	Cowper, Sedgwick S., Esq. *Messrs. J. Clinch and Son, Abchurch-lane, E.C.*
1862	Cox, Edward William, Esq., Barrister-at-Law, Recorder of Falmouth. 1, *Essex-court, Temple, E.C.; and Moat-mount, Highwood, Middlesex.*
1865	Coysh, John S., Esq. *Levant-house, St. Helen's-place, E.C.*
1867	Crane, Leonard, Esq., M.D. 7, *Albemarle-street, W.*
1853	Craufurd, Captain F. A. B., R.N. *Care of Messrs. Woodhead and Co.*, 44, *Charing-cross, S.W.*
1857	Craufurd, Lieut.-General James Robertson, Grenadier Guards. *Travellers' Club, S.W.; and* 36, *Prince's-gardens, W.*
1848	Crawford, Robert Wigram, Esq., M.P. 71, *Old Broad-street, E.C.*
1830	480 Crawfurd, John, Esq., F.R.S. *Athenæum Club, S.W.; and* 4, *Elvaston-place, Queen's-gate, S.W.*
1866	Crawfurd, O. J., Esq. *Athenæum Club, S.W.*
1861	Creswell, Rev. S. F., M.A. *The Grammar School, Dartford, North Kent.*
1859	*Creyke, Capt. Richard Boynton, R.N. *Ulverstone, Lancashire.*
1856	Croker, T. F. Dillon, Esq. 19, *Pelham-place, Brompton, S.W.*
1864	Croll, A. A., Esq., C.E. *Southwood, Southwood-lane, Highgate.*
1860	*Croskey, J. Rodney, Esq. 84, *King William-street, E.C.; and Forest-house, High Beech, Essex.*
1860	Crosse, the Rev. Thomas, D.C.L., M.R.A.S. *Hastings.*
1862	Crossman, James Hiscutt, Esq. *Rolls-park, Chigwell, Essex.*

Year of Election.

1863 *Crowder, Thos. Mosley, Esq., M.A. *Thornton-hall, Bedale, Yorkshire.*

1852 490 Crowdy, James, Esq. 17, *Serjeant's-inn, E.C.*

1859 Cull, Richard, Esq., F.S.A. 13, *Tavistock-street, Bedford-square, W.C.*

1857 Cumming, William Fullarton, Esq., M.D. *Athenæum Club, S.W.; and Athol-crescent, Edinburgh.*

1847 *Cunard, Sir Edward, Bart. *Care of Messrs. D. and C. MacIver, Liverpool.*

1860 Cunliffe, Roger, Esq. 24, *Lombard-street, E.C.; and* 10, *Queen's-gate, South Kensington, W.*

1864 Cunningham, H. Esq.

1853 Cunningham, John Wm., Esq., Sec. King's College. *Somerset-house, W.C.; and Harrow, N.W.*

1862 *Cunynghame, Major-Gen. A. T., C.B. *Commanding Dublin Division, Royal Barracks, Dublin.*

1865 Cure, Capel, Esq. 51, *Grosvenor-street, W.*

1843 *Cursetjee, Manockjee, Esq., F.R.S.N.A. *Villa-Byculla, Bombay,*

1839 500*Curtis, Timothy, Esq.

1865 Curzon, Hon. R. 24, *Arlington-street, W.; and Parham-park, Steyning, Sussex.*

1864 Dallas, A. G., Esq. 36, *Beaufort-gardens, W.*

1863 *Dalgety, Fred. G., Esq. 8, *Hyde-park-terrace, W.*

1865 D'Almeida, W. B., Esq. 19, *Green-park, Bath.*

1863 Dalrymple, Donald, Esq. *Norwich.*

1867 Dalrymple, Geo. Elphinstone, Esq. *Logie, Elphinstone, Aberdeenshire.*

1857 Dalton, D. Foster Grant, Esq. *Shanks-house, near Wincanton, Somerset.*

1859 Dalyell, Sir Robt. Alex. Osborn, Bart. *H.M.'s Consul at Jassy; and* 120, *Belgrave-road, S.W.*

1866 Damer, Lt.-Col. Lionel S. Dawson. 2, *Chapel-street, Grosvenor-square, W.*

1862 510 Darvall, John Bayly, Esq.

1838 *Darwin, Charles, Esq., M.A., F.R.S. 6, *Queen Anne-street, Cavendish-square, W.*

1860 Dasent, John Bury, Esq. 22, *Warwick-road, Maida-hill, W.*

1863 Davies, R. H., Esq.

1865 *Davis, Alfred, Esq. *Norfolk-hotel, Norfolk-square, Hyde-park, W.*

1866 Davis, Edmund F., Esq. 6, *Cork-street, Bond-street, W.*

1858 Davis, Dr. Francis William, Surgeon R.N. *H.M.S. 'Alert;' and Elm-lodge, St. Ann's-hill, Wandsworth, S.W.*

1866 Davis, Frederick E., Esq. 20, *Blandford-square, N.W.*

1861 Davis, Staff-Commander John Edward, R.N. *Hydrographic-office, Admiralty, S.W.*

1846 Davis, Sir John Francis, Bart., K.C.B., F.R.S., F.R.S.N.A. *Athenæum Club, S.W.; and Hollywood, near Bristol.*

1840 520*Dawnay, the Hon. Payan. *Beningborough-hall, Newton-upon-Ouse, Yorkshire.*

1865 Debary, Rev. Thomas, M.A. 35, *Mount-street, W.*

1866 Debenham, William, Esq. 3, *Porchester-square, Hyde-park, W.*

1859 De Blaquiere, John, Lord. 9, *Stratford-place, W.*

Year of Election.		
1858		De Bourgho, T. J., Esq. 6, *Charing-cross, S.W.*
1856		De Crespigny, Lieut. C., R.N.
1856		De Gex, William Francis, Esq. 25, *Throgmorton-street, E.C.*
1853		De Grey and Ripon, George Frederick Samuel, Earl. 1, *Carlton-gardens, S.W.; and Studley Royal, Ripon.*
1865		De Laski, A., Esq.
1862		Denham, Adm. Sir Henry Mangles, R.N., K.C.B. 21, *Carlton-road, Maida-vale, W.*
1860	530	Denison, Alfred, Esq. 6, *Albemarle-street, W.*
1834		*Denison, Sir William Thomas, K.C.B., Lieut.-Col. R.E., F.R.S. *Observatory, East Sheen.*
1836		Denman, Rear-Admiral the Hon. Joseph. *Commander-in-Chief, Pacific; and* 17, *Eaton-terrace, S.W.*
1833		*Derby, Edward Geoffrey, Earl of, P.C., F.L.S. 23, *St. James's-square, S.W.; and Knowsley-park, Prescott, Lancashire.*
1867		De Salis, Col. Rodolph, C.B. 123, *Pall-mall, S.W.*
1854		*Devaux, Alexander, Esq. 2, *Avenue-road, Regent's-park, N.W.*
1837		*Devonshire, William Cavendish, Duke of, LL.D., D.C.L., M.A., F.R.S. *Devonshire-house, Piccadilly, W.; and Hardwicke-hall, Derbyshire.*
1865		Dew, Capt. Roderick, C.B., R.A. *Army and Navy Club, S.W.; and St. James's-street, S.W.*
1864		Dick, A. H. Esq., M.A., *Roseland-house, Partrick, near Glasgow.*
1862		Dick, Capt. Charles Cramond. *Exeter, Devon.*
1866	540	*Dick, Fitzwilliam, Esq., M.P. 20, *Curzon-street, Mayfair, W.*
1861		Dick, Robert Kerr, Esq., Bengal Civil Service. *Oriental Club, W.*
1866		Dick, William Græme, Esq. 29, *Leinster-square, W.*
1854		*Dickenson, Sebastian Stewart, Esq., Barrister-at-Law. *Brown's-hill, Stroud, Gloucestershire.*
1830		*Dickinson, Francis Henry, Esq., F.S.A. 8, *Upper Harley-street, W.; and Kingweston-park, Somerset.*
1833		Dickinson, John, Esq., F.R.S., F.S.A. 39, *Upper Brook-street, W.; and Abbott's-hill, Hemel-Hempstead.*
1852		Dickinson, John, Esq., jun. *Clarence-chambers*, 12, *Haymarket, S.W.; and Abbott's-hill, Hemel-Hempstead.*
1859		Dickson, A. Benson, Esq. 4, *New-square, Lincoln's-inn, W.C.*
1858		Dickson, Charles Hanmer, Esq. *H.B.M. Consul, Súkum Kalé, Black Sea. Care of J. Murray, Esq., Foreign-office, S.W.*
1860		Dickson, Lieut.-Col. Lothian Sheffield. 10, *Stanhope-terrace, Hyde-park, W.*
1860	550	Dietz, Bernard, Esq., of Algoa Bay. 3, *Dorset-square, W.*
1859		Digby, G. Wingfield, Esq. *Sherborne-castle, Dorset.*
1860		Digby, Lieut.-Col. John Almerus. *Chalmington-house, Cattstock, Dorchester.*
1845		*Dilke, Sir Charles Wentworth, Bart., M.P. 76, *Sloane-street, S.W.*
1859		*Dilke, Charles Wentworth, Esq. 76, *Sloane-street, S.W.*
1856		Dillon, the Hon. Arthur. 17, *Clarges-street, W.*
1864		Dimsdale, J. C., Esq. 50, *Cornhill, E.C.; and* 52, *Cleveland-square, S.W.*
1867		Dix, Thomas, Esq. 10, *Amwell-street, W.C.*

Year of Election.

1861 Dixon, Lieut.-Colonel John. 10, *Seymour-street, Portman-square.*

1854 Dixon, W. Hepworth, Esq., F.S.A. 6, *St. James's-terrace, Regent's-park, N.W.*

1857 560 Dobie, Robert, Esq., M.D., R.N. 7, *Houghton-place, Ampthill-square, Hampstead-road, N.W.*

1854 Dodson, John George, Esq., M.P. 6, *Seamore-place, Mayfair, W.*

1854 Domville, William T., Esq., M.D., R.N. *Army and Navy Club, S.W.*

1867 Donald, James, Esq. 20, *Melville-terrace, Edinburgh.*

1858 Donne, John, Esq. *Instow, North Devon.*

1864 Doran, Dr. John, F.S.A. *Royal-crescent, Notting-hill, W.*

1850 Dover, John William, Esq. 132, *Stanley-street, Belgravia, S.W.*

1853 Doyle, Sir Francis Hastings C., Bart. *Custom-house, E.C.*

1845 *Drach, Solomon Moses, Esq. F.R.A.S. 39, *Howland-street, Fitzroy-square, W.*

1864 Drew, Major H. 14, *St. James's-square, S.W.*

1865 570 Drummond, E. A., Esq. 2, *Bryanston-square, W.*

1846 Drummond, Lieut.-General John. *The Boyce, Dymock, Gloucestershire.*

1846 Drury, Capt. Byron, R.N. *The United Service Club, S.W.*

1857 Dublin, His Grace the Archbishop of. *Dublin.*

1851 *Du Cane, Major Francis, R.E. 64, *Lowndes-square, S.W.*

1851 *Ducie, Henry John, Earl, F.R.S. 30, *Prince's-gate, S.W.*

1859 Duckworth, Henry, Esq. 2, *Gambier-terrace, Liverpool.*

1860 *Duff, Mountstuart Elphinstone Grant, Esq., M.P. 4, *Queen's-gate-gardens, South Kensington, W.*

1857 *Dufferin, Right Hon. Lord, K.P., K.C.B. *Dufferin-lodge, Fitzroy-park, Highgate, N.*

1866 *Dugdale, Captain Henry Charles G. *Merevale-hall, Atherstone, Warwick.*

1867 580*Dugdale, John, Esq. 1, *Hyde-park-gardens; and Llwyn, Llanfyllin, Oswestry.*

1864 Duke, Sir James, Bart. *Laughton-lodge, Sussex.*

1863 Duncan, Capt. Francis, R.A., M.A., F.R.S. *The Citadel, Plymouth.*

1861 *Duncan, George, Esq. 45, *Gordon-square, W.C.*

1840 *Dundas, Right Hon. Sir David, Q.C., M.P. 13, *King's-Bench-walk, Temple, E.C.; and Oehtertyre, Stirling.*

1860 Dunell, Henry James, Esq. 12, *Hyde-park-square, W.*

1859 *Dunlop, R. H. Wallace, Esq., C.B., Indian Civil Service. *Messrs. Grindlay and Co., Parliament-street.*

1860 *Dunmore, Charles Adolphus Murray, Earl of. 24, *Carlton-house-terrace, S.W.*

1837 *Dunraven, Edwin Richard, Earl of, F.R.S. *Adare-manor, Limerick; and Dunraven-castle, Glamorganshire.*

1856 Duprat, Chevalier Alfredo. *H.M.F. Arbitrator, Cape Town, Cape of Good Hope.*

1852 590 D'Urban, M.-Gen. W. J. *Deputy Quartermaster-General, Canada; U. S. Club, S.W.; and Newport, near Exeter.*

1865 Dutton, F. S., Esq. *Reform Club, S.W.; and Adelaide, Australia.*

1867 Eadie, Robert, Esq. *Blaydon-on-Tyne, Durham.*

1854 Eardley-Wilmot, Capt. A. P., R.N., C.B. *H.M.S. 'Nile,' Queenstown; Deptford Dockyard, E.*

Year of Election.	
1856	Eardley-Wilmot, Col. F., M.R.A. *Shoebury Ness, Essex.*
1866	Eardley-Wilmot, Sir John E. 3, *Elvaston-place, Queen's-gate, W.*
1865	Eassie, William, Esq., F.L.S., 5, *Bath-villas, The Park, Gloucester.*
1857	Eastwick, Captain W. J. 12, *Leinster-terrace, Hyde-park, W.*
1863	Eaton, F. A., Esq. *New University Club, St. James's-street, S.W.*
1862	*Eaton, H., Esq. 16, *Prince's-gate, Hyde-park, W.*
1862	600*Eaton, Henry William, Esq., M.P. 16, *Prince's-gate, Hyde-park, W.*
1864	*Eaton, William Meriton, Esq., 16, *Prince's-gate, Hyde-park, W.*
1866	Eatwell, Surgeon-Major W. C. B., M.D. 17, *Kensington-park-terrace, Notting-hill, W.*
1861	Eber, General F. 33, *St. James's-square, S.W.*
1862	Ebury, Lord. 107, *Park-street, Grosvenor-square, W.; and Moor-park, Herts.*
1862	Eden, Rear-Adm. Charles, C.B. 20, *Wilton-place, S.W.*
1858	Edge, Rev. W. J., M.A. *Benenden-vicarage, near Staplehurst, Kent.*
1863	Edgeworth, M. P., Esq., BENG.C.S. *Mastrim-house, Anerly, S.*
1867	*Edward, James, Esq. *Balruddery, by Dundee, N.B.*
1866	*Edwardes, Thomas Dyer, Esq. 5, *Hyde-park-gate, Kensington, W.*
1865	610 Edwards, G. T., Esq., M.A. 60, *Gloucester-terrace, W.*
1861	*Edwards, Henry, Esq. 53, *Berkeley-square, W.*
1860	Edwards, Major James B., R.E. *Junior United Service Club, S.W. Messrs. Smith, Elder, and Co.*
1857	Egerton, Commander Charles Randell, R.N. 7, *Rutland-gate, S.W.*
1853	Egerton, Captain the Hon. Francis, R.N. *Bridgewater-house, S.W.; and H.M.S. 'St. George.'*
1863	*Elder, George, Esq. *Knock-castle, Ayrshire.*
1867	Eley, Charles John, Esq. *Junior Athen. Club, S.W.; and Old Brompton, S.W.*
1865	Elias, Ney, Jun., Esq. 64, *Inverness-terrace, Bayswater, W.*
1845	Ellenborough, Edward, Earl of, G.C.B. *Southam-house, near Cheltenham.*
1863	Ellerton, John L., Esq. 6, *Connaught-place, Hyde-park, W.*
1860	620 Elliot, George, Esq., C.E. *The Hall, Houghton-le-Spring, near Fence Houses, Durham.*
1857	*Elliot, Capt. L. R. *La Mailleraye-sur-Seine, Seine Inférieure.*
1830	*Elliott, Rev. Charles Boileau, M.A., F.R.S. *Tattingstone, Suffolk.*
1865	Ellis, W. E. H., Esq. *Hasfield-rectory, Gloucester; Oriental Club, W.; and Byculla Club, Bombay.*
1858	Elphinstone, Major Howard C., R.E. *Buckingham-palace, S.W.*
1857	Elton, Sir Arthur H., Bart. *Athenæum Club, S.W.; and Clevedon-court, Somersetshire.*
1862	*Emanuel, Harry, Esq. 8, *Clarence-terrace, Regent's-park, N.W.*
1866	Emanuel, Joel, Esq., F.A.S. *Norfolk-villa, Lansdowne-road, Notting-hill, W.*
1863	Emslie, John, Esq. 47, *Gray's-inn-road, W.C.*
1830	Enderby, Charles, Esq., F.R.S., F.L.S. 13, *Great St. Helen's, E.C.*
1860	630 Enfield, Edward, Esq., F.S.A. 19, *Chester-terrace, Regent's-park, N.W.*
1863	Engleheart, Gardner D., Esq. 1, *Eaton-place-south, S.W.*

Year of Election.	
1852	Erskine, Vice-Admiral John Elphinstone, M.P., C.B. *H.M.S. 'Edgar'; 1 L, Albany, W., and Cardross, Stirling, N. B.*
1857	*Esmeade, G. M. M., Esq. 29, *Park-street, Grosvenor-square, W.*
1850	Espinasse, Major J. W., 12th Regt. *Messrs. Richardson, and Co., Cornhill.*
1865	Evans, Colonel William Edwyn. 24, *Great Cumberland-place, Hyde-park, W.*
1857	Evans, F. J., Esq., Staff Commander, R.N., F.R.S., F.R.A.S. 4, *Wellington-terrace, Charlton, Blackheath, S.E.*
1830	*Evans, Vice-Admiral George. 1, *New-street, Spring-gardens, S.W.; and Englefield-green, Chertsey.*
1857	Evans, Thos. Wm., Esq., M.P. 1, *Dartmouth-street, Westminster, S.W.; and Allestree-wall, Derby.*
1830	*Evans, W. Esq.
1867	640 Evans, W. Herbert, Esq. *St. James's Club, Grafton-street, W.*
1861	Evelyn, Lieut.-Colonel George P. 4, *Onslow-crescent, Brompton, S.W.*
1851	*Evelyn, William J., Esq., F.S.A. *Evelyn Estate Office, Evelyn-street, Deptford.*
1830	*Everett, James, Esq., F.S.A.
1865	Everitt, George A., Esq. *Oakfield, Moseley, near Birmingham.*
1859	Ewart, William, Esq., M.P. 6, *Cambridge-square, W.*
1856	Ewing, J. D. Crum, Esq. 21, *Birchin-lane, E.C.*
1857	Eyre, Edward J., Esq.
1861	Eyre, George E., Esq. 59, *Lowndes-square, Brompton, S.W.*
1856	Eyre, M.-Gen. Sir Vincent, C.B. *Athenæum Club, S.W.; and* 33, *Thurloe-square, S.W.*
1861	650 Fairbairn, William, Esq., C.E., F.R.S. *Manchester.*
1856	Fairholme, George Knight, Esq. *Union Club, S.W.; and Ravenswood, Melrose, N.B.*
1866	Fairman, Edward St. John, Esq., F.G.S., &c. 874, *Via Santa Maria, Pisa. Care of H. Fairman, Esq.*, 20, *Rochester-terrace, Camden-town, N.W.*
1838	Falconer, Thomas, Esq. *Usk, Monmouthshire.*
1857	Falkland, Lucius Bentinck, Viscount. *Skuttershelfe, Yorkshire.*
1855	*Fanshawe, Admiral E. G. 63, *Eaton-square, S.W.*
1863	*Farrer, W. Jas., Esq. 24, *Bolton-street, Piccadilly, W.*
1864	Faulkner, Charles, Esq., F.S.A., F.G.S. *Deddington, Oxon.*
1863	*Faunthorpe, Rev. J. P., B.A. *Training-college, Battersea.*
1853	*Fayrer, Joseph, Esq., M.D. *Calcutta. Care of General Spens*, 14, *Drummond-place, Edinburgh.*
1858	660 Fazakerley, J. N., Esq. 17, *Montagu-street, Portman-square, W.*
1866	Felkin, Wm., Esq., Jun., F.Z.S. *Beeston, near Nottingham.*
1864	Fergusson, J., Esq. 6, *Gloucester-square, Hyde-park.*
1863	Fergusson, Alex., Esq. *Champion-hill, Camberwell, S.*
1840	*Fergusson, James, Esq., F.R.A.S. 20, *Langham-place, W.*
1860	Ferro, Don Ramon de Silva.
1865	Field, Hamilton, Esq. *Thornton-road, Clapham-park.*
1830	Findlay, Alexander, Esq. *Hayes, Kent, S.E.*

Year of Election.		
1844		Findlay, Alex. George, Esq. 53, *Fleet-street, E.C.; and Hayes, Kent, S.E.*
1862		Finnis, Thomas Quested, Esq., Alderman. *Wanstead, Essex, N.E.*
1859	670	Fisher, Anthony L., Esq., M.D. 14, *York-place, Baker-street, Portman-square, W.*
1863		Fisher, John, Esq. 60, *St. James's-street, S.W.*
1859		Fisher, Robert, Esq.
1857		*Fitzclarence, Commander the Hon. George, R.N.
1863		Fitzgerald, J. F. V., Esq. 11, *Chester-square, S.W.*
1861		Fitzgerald, Captain Keane. 2, *Portland-place, W.*
1864		Fitz-Patrick, Lieut. Francis Skelton, 42nd Regt. Madras Army.
1859		*Fitz-Roy, George Henry, Esq. *Downshire-house, Roehampton; and Office of Maritime Customs, Shanghai.*
1857		Fitzwilliam, the Hon. C. W., M.P. *Brooks' Club, St. James's-street, S.W.*
1837		*Fitzwilliam, William Thomas, Earl. 4, *Grosvenor-square, W.; and Wentworth-house, Rotherham, Yorkshire.*
1865	680	*Fitzwilliam, Wm. S. Esq. 28, *Ovington-square, Brompton, S.W.*
1863		Fleming, G., Esq. *Brompton Barracks, Chatham.*
1861		*Fleming, John, Esq. 18, *Leadenhall-street, E.C.*
1865		Fleming, Rev. T. S. *Roscoe-place, Chapeltown-road, Leeds.*
1853		*Flemyng, Rev. Francis P. *Glenfeulan, near Helensburgh, Glasgow.*
1862		Fletcher, John Charles, Esq. *Dale-park, Arundel; and Eaton-place, S.W.*
1857		Fletcher, Thomas Keddey, Esq. *Union-dock, Limehouse, E.*
1866		Flood, John Edwin, Esq. 126, *High-street, Poplar, E.*
1864		Flower, Capt. L. 19, *Great College-street, S.W.; Banstead, Surrey; and Queen's United Service Club, S.W.*
1863		Foley, Col. the Hon. St. George, C.B.
1861	690	Foord, John Bromley, Esq. 52, *Old Broad-street, E.C.*
1860		Forbes, Commander Charles S., R.N. *Army and Navy Club, S.W.; and* 18, *James-street, Buckingham-gate, S.W.*
1863		Forbes, Capt. C. J. F. Smith. 5, *Hatch-street, Dublin.*
1867		Forbes, Geo. Edward, Esq. *New Club, Edinburgh; of Clinton District, West Moreton; Ravenswood, district of Kennedy, Carpentaria, Queensland. Care of J. B. Edenborough and Co., 54, Moorgate-street, E.C.*
1860		Forbes, the Hon. Horace Courtenay, M.A. *Oriel College, Oxford.*
1845		Forster, Rev. Charles, B.D. *Stisted-rectory, Essex.*
1839		*Forster, William Edward, Esq., M.P. *Burley, near Otley.*
1867		Forsyth, T. Douglas, Esq., C.B. (B.C.S.) *Commissioner, Jullundhur, Punjab. Care of Messrs. Smith, Elder, and Co., 65, Cornhill, E.C.*
1861		Forsyth, William, Esq., M.P., Q.C. 61, *Rutland-gate, S.W.*
1864		Fort, Richard, Esq., M.P. *Read-hall, Whalley, Lancashire; and* 24, *Queen's-gate-gardens, South Kensington, W.*
1853	700	Fortescue, Chichester S., Esq., M.P. 7, *Carlton-gardens, S.W.*
1861		*Fortescue, Hon. Dudley F., M.P. 9, *Hertford-street, W.*
1866		Foster, Edmond, Esq., Jun. 9, *Albion-street, Hyde-park, W.*
1864		Foster, H. J., Esq.

Year of Election	
1864	Foster, Capt. W. J. *Stubingdon-house, Fareham, Hants.*
1863	*Fowler, J. T., Esq. *Government Inspector of Schools, Adyar, Madras, India. Care of Rev. A. Wilson, National Society's Office, Sanctuary, Westminster.*
1850	*Fowler, Robert N., Esq., M.A. 50, *Cornhill, E.C.; and Tottenham, N.*
1861	Fox, Arthur Douglas, Esq., C.E. 135, *Marine Parade, Brighton; and* 8, *New-street, Spring-gardens, S.W.*
1859	Fox, Lieut.-Colonel A. Lane. 10, *Upper Phillimore-gardens, Kensington, W.*
1830	*Fox, Lieut.-General C. R. *Travellers' Club, S.W.; and* 1, *Addison-road, Kensington, W.*
1866	710 Fox, D. M., Esq., Chief Engineer of the Santos and St. Paulo Railway. *St. Paulo, Brazil.*
1864	*Fox, F. E. Esq., B.A. *Elmslea, Tottenham, Middlesex.*
1865	Fox, Samuel Crane, Esq. *Woodford-house, Granville-park, Blackheath, S.E.*
1861	Franklin, Joseph Lewis, Esq. 148, *New Bond-street, W.*
1865	*Franks, Aug. W., Esq. 55, *Upper Seymour-street, W.*
1860	Franks, Charles W., Esq.
1854	Fraser, Charles, Esq. 15, *Lancaster-gate, Bayswater-road, W.*
1867	Fraser, Edward John, Esq. (Solicitor). 1, *Percy-villas, Campden-hill, Kensington, W.*
1862	Fraser, Com. H. A., I.N.
1860	Fraser, Thos., Esq.
1866	720 Fraser, Capt. T. *Otago, New Zealand.*
1860	Freeman, Daniel Alex., Esq., Barrister-at-law. *Plowden-buildings, Temple, E.C.*
1864	Fremantle, Lieut.-Col. Arthur. *Guards' Club, S.W.*
1863	Fremantle, Captain Edmund Robert, R.N. 4, *Upper Eccleston-street, S.W.*
1856	Fremantle, Rt. Hon. Sir Thomas F., Bart. 4, *Upper Eccleston-street, Belgrave-square, S.W.*
1864	Freme, Major James H. *Wrentnall-house, Shropshire; and Army and Navy Club, S.W.*
1850	Frere, Bartle John Laurie, Esq. 45, *Bedford-square, W.C.*
1839	*Frere, George, Jun., Esq. *Cape of Good Hope; and* 45, *Bedford-square, W.C.*
1867	Frere, Sir Hy. Bartle Edw., K.C.B., G.C. Star of India. 44, *Princes-gardens, W.*
1842	Frere, William Edw., Esq., F.R.A.S. *Bombay; and* 42, *Clarges-street, W.*
1853	730 Frith, John Griffith, Esq. 13, *Wimpole-street, W.; and* 11, *Austin Friars, E.C.*
1859	Fryer, William, Esq. 39, *Marlborough-hill-gardens, St. John's-wood, N.W.*
1863	Fuidge, William, Esq. 5, *Park-row, Bristol.*
1865	Fuller, Thomas, Esq. 119, *Gloucester-terrace, Hyde-park, W.*
1860	Fussell, Rev. J. G. Curry. 16, *Cadogan-place, S.W.*
1861	Fynes Clinton, Rev. Charles J., M.A. 3, *Montague-place, Russell-square, W.C.; and Cromwell, Notts.*
1866	Fytche, Colonel Albert. *Reform Club, S.W.*
1863	*Gabrielli, Antoine, Esq. 6, *Queen's-gate-terrace, Kensington, W.*

Year of Election.	
1858	Gaisford, Thomas, Esq. *Travellers' Club, S.W.*
1861	Gallagher, John, Esq., M.D. *Reform Club, S.W.; and* 109, *Westbourne-terrace, W.*
1855	740*Galloway, John James, Esq.
1848	*Galton, Capt. Douglas, R.E. 12, *Chester-street, Grosvenor-place, S.W.*
1850	*Galton, Francis, Esq., M.A., F.R.S. 42, *Rutland-gate, S.W.; and* 5, *Bertie-terrace, Leamington.*
1854	*Gammell, Major Andrew. *Drumtochty, Kincardineshire, N.B.*
1861	Garden, Robert Jones, Esq. 30, *Cathcart-road, South Kensington, S.W.*
1865	Gardner, Capt., G. H., R.N. *Coast-Guard-office, Spring-gardens, S.W.*
1866	Gardner, John Dunn, Esq. 122, *Park-street, Park-lane, W.*
1863	Gascoigne, Frederic, Esq. *Parlington, Yorkshire.*
1859	*Gassiot, John P., Jun., Esq. 6, *Sussex-place, Regent's-park, N.W.*
1866	Gastrell, Lieut.-Col. James E. (B. Staff Corps). *Surveyor-General's Office, Calcutta.*
1866	750*Gatty, Charles H., Esq., M.A., *Felbridge-park, East Grinstead, Sussex.*
1838	*Gawler, Colonel George, K.H. *United Service Club, S.W.; and Southsea-villa, Southsea.*
1865	George, H. B., Esq. 63, *Lincoln's-inn-fields, W.C.*
1859	Gerstenberg, Isidore, Esq. 11, *Warnford-court, Throgmorton-street, E.C.*
1865	*Gibbons, Sills John, Esq., Alderman. 13, *Upper Bedford-place, Russell-square, W.C.*
1866	*Gibb, George Henderson, Esq., 13, *Victoria-street, Westminster, S.W.*
1859	*Gibbs, H. Hucks, Esq. *St. Dunstan's, Regent's-park, N.W.*
1864	Gibson, A., Esq. *Achinreoch, Brechin, N.B.*
1866	Gibson, John, Esq. 2, *Piccadilly, Bradford, Yorkshire; and* 2, *Field-court, Gray's-inn, W.C.*
1855	Gillespie, Alexander, Esq. *Heathfield, Walton-on-Thames, Surrey.*
1866	760*Gillespie, William, Esq. (*of Torbane-hill*). 46, *Melville-street, Edinburgh.*
1857	Gillespy, Thomas, Esq. *Brabant-court, Philpot-lane, E.C.*
1863	*Gillett, William, Esq. 6*L*, *Albany, W.*
1861	Gilliat, Alfred, Esq. *Longham-house, near Wimborne, Dorset.*
1863	Gillies, Robert, Esq., C.E. *Dunedin, Otago, New Zealand.*
1867	Gisborne, Fred. N., Esq., Engineer and Electrician. 445, *West Strand, W.C.*
1836	Gladdish, Col. William. *Bycliffes, Gravesend.*
1864	Gladstone, George, Esq. *The Terrace, Clapham-common, S.*
1863	Gladstone, J. H., Esq., Ph.D. 17, *Pembridge-square, W.*
1862	*Gladstone, Robert Stuart, Esq. 11, *New Broad-street, E.C.*
1846	770*Gladstone, William, Esq. 57½, *Old Broad-street, E.C.*
1864	*Gladstone, W. K., Esq. 39*a*, *Old Bond-street, W.; and Fitzroy-park, Highgate, N.*
1860	Glascott, Commander Adam Giffard, R.N., Acting Commissioner on the Turko-Persian Frontier. *Messrs. Chard,* 3, *Clifford's Inn, Fleet-street, E.C.*
1867	Glass, H. A., Esq. 4, *Gray's-inn-square, W.C.*
1857	Gleig, Rev. G. R., M.A. *Chaplain-General, Chelsea-hospital, S.W.*

Year of Election.		
1854		Glen, Joseph, Esq., Mem. Geogr. Soc. of Bombay. *Oriental Club, W.*
1857		Glover, Commr. John H., R.N. *Lagos; and Army and Navy Club, S.W.*
1866		Glover, Robert Reaveley, Esq. 30, *Great St. Helen's, E.C.*
1860		Glyn, Capt. H. Carr, R.N. 1, *Eeeleston-street, Belgrave-square, S.W.*
1864		Glyn, Sir Richard George, Bart. *Army and Navy Club, S.W.*
1862	780	Goddard, James, Jun., Esq. 14, *Mincing-lane, E.C.*
1863		Goldsmid, Lt.-Colonel Frederick John. *Harrow-on-the-hill; Southborough, Kent; and United Service Club, S.W.*
1861		Goldsmid, Julian, Esq. 20, *Portman-square, W.*
1860		Gooch, Thomas Longridge, Esq. *Team-lodge, Saltwell, Gateshead-on-Tyne.*
1864		Goodall, George, Esq. *Messrs. Cox and Co., Craig's-court; and Junior Carlton Club, W.*
1867		*Goodenough, Fred. Addington, Esq. 4, *Leinster-gardens, W.*
1863		*Goodenough, Capt. J. G., R.N. *U. S. Club, S.W. Care of Messrs. Stilwell, 22, Arundel-street, Strand, W.C.*
1864		*Goodenough, Major W., R.A. *Royal Artillery, Aldershot.*
1861		Gooldin, Joseph, Esq. 48, *Upper Hyde-park-gardens, W.*
1856		*Gordon, Colonel the Hon. Alexander H., C.B.
1854	790	Gordon, Harry George, Esq. 1, *Clifton-place, Hyde-park-gardens, W.; and Killiechassi, Dunkeld, Perthshire.*
1856		Gordon, Admiral the Honourable John. 28, *Queen Anne-street, W.*
1853		Gordon, Vice-Admiral Robert. *United Service Club, S.W.*
1853		Gore, Richard Thomas, Esq. 6, *Queen-square, Bath.*
1859		Gosling, Fred. Solly, Esq. 18, *New-street, Spring-gardens, S.W.*
1862		Goss, Samuel Day, Esq., M.D. 111, *Kennington-park-road, S.*
1835		Gould, Lieut.-Colonel Francis A. *Buntingford, Herts.*
1846		Gould, John, Esq., F.R.S., F.L.S. 26, *Charlotte-street, Bedford-square, W.C.*
1865		Gowen, Colonel J. E.
1867		Grabham, Michael, Esq., M.D. *Madeira. Care of C. R. Blandy, Esq., 25, Crutched Friars, E.C.*
1858	800	Graham, Cyril C., Esq. 9, *Cleveland-row, St. James's, S.W.; and Debroe-house, Watford, Herts.*
1861		Grant, Alexander, Esq. *Oakfield-house, Hornsey, N.*
1861		Grant, Daniel, Esq. 11, *Warwick-road, Upper Clapton, N.*
1865		*Grant, Francis W., Esq. *Army and Navy Club, S.W.*
1860		Grant, Major James A., C.B. *E. India U. S. Club, S.W.; and Dingwall, Ross-shire, N.B.*
1862		Grant, Lieut. J. M. (late 25th Reg.) *East London, Cape of Good Hope.*
1860		Grantham, Capt. James, R.E. *Scawby, Brigg, Lincolnshire; and Royal Engineer Office, Devonport.*
1830		*Gray, John Edw., Esq., PH. DR., F.R.S., Z.S. and L.S. *British Museum W.C.*
1862		Greathed, Lieut.-Colonel Wilberforce, W. H., C.B.
1863		Greaves, Rev. Richard W. 1, *Whitehall-gardens, W.*

Year of Election.	
1861	810 Green, Capt. Francis. 89, *Eccleston-square, S.W.*
1830	Greene, Thomas, Esq. *Whittington-hall, near Burton, Westmoreland.*
1857	*Greenfield, W. B., Esq. 59, *Porchester-terrace, Hyde-park, W.; and Union Club, S.W.*
1865	Greg, W. R., Esq., Comptroller of H.M.S. Stationery Office. *Wimbledon, S.W.*
1858	Gregory, Charles Hutton, Esq., C.E. 1, *Delahay-street, Westminster, S.W.*
1860	*Gregory, Francis Thomas, Esq. *Queensland.*
1858	*Gregory, Isaac, Esq. *Chorlton-hall, Victoria-park, Manchester.*
1857	*Grellet, Henry Robert, Esq. *Savage-gardens, Tower-hill, E.C.*
1865	Grenfell, Henry R., Esq., M.P. 15, *St. James's-place, S.W.*
1858	Grenfell, Pascoe St. Leger, Esq. *Maesteg-house, Swansea.*
1853	820 Grenfell, Riversdale W., Esq. 27, *Upper Thames-street, E.C.*
1830	*Greswell, Rev. Richard, M.A., F.R.S. 39, *St. Giles, Oxford.*
1866	Grey, Charles, Esq. 13, *Carlton-house-terrace, S.W.*
1837	*Grey, Sir George, K.C.B. *Governor and Commander-in-Chief, New Zealand. Colonial Office.*
1844	*Grey, Ralph Wm., Esq., Commissioner of Customs. 47, *Belgrave-square, S.W.; and Chipchase-castle, Hexham.*
1864	Grierson, Charles, Esq.
1862	Griffin, James, Esq. *The Retreat, Portsea; and The Hard, Portsea, Hants.*
1861	*Griffith, Daniel Clewin, Esq. 20, *Gower-street, W.C.*
1839	Griffith, John, Esq. 16, *Finsbury-place-south, E.C.*
1863	Griffith, Sir Richard. 20, *Eccleston-square, S.W.*
1836	830 Griffith, Richard Clewin, Esq. 20, *Gower-street, W.C.*
1867	Griffiths, Captain A. G. F., 63rd Reg. (Major of Brigade, Gibraltar). *Care of E. S. Codd, Esq., 35, Craven-street, Strand, W.C.*
1855	Grindrod, R. B., Esq., M.D., LL.D., F.L.S., &c. *Townsend-house, Malvern.*
1864	Grinnell, C., Esq. *Burlington-chambers, 180, Piccadilly, W.*
1861	Grosvenor, Lord Richard, M.P. 33, *Upper Grosvenor-street, W.*
1858	Grote, George, Esq. 12, *Savile-row, W.*
1857	Gruneisen, Charles Lewis, Esq. 16, *Surrey-street, Strand, W.C.*
1861	Gunnell, Commander Edmund H., R.N. *Army and Navy Club, S.W.; 21, Argyll-road, Campden-hill, W.*
1859	*Gurney, John H., Esq. *Calton-hall, Norwich.*
1857	Gurney, Samuel, Esq., M.P. 20, *Hanover-terrace, Regent's-park, W.; and Carshalton, Surrey.*
1862	840 Guthrie, James Alexander, Esq. 30, *Portland-place, W.*
1865	Gwyther, John H., Esq. *Meadowcroft, Lower Sydenham.*
1863	Hadfield, Wm., Esq.
1865	Hadley, Henry, Esq., M.D. *Needwood-lodge, Bay's-hill, Cheltenham.*

Year of Election.	
1863	Hadow, P. D., Esq. *Sudbury-priory, Middlesex.*
1865	Halcombe, Rev. J. J. *Charter-house, E.C.*
1865	Hale, Warren S., Esq., Alderman. 71, *Queen-street, Cheapside, E.C.*
1860	Haliday, Lieut.-Colonel William Robert. *United Service Club, S.W.*
1853	Halifax, Viscount, G.C.B., M.P. 10, *Belgrave-square, S.W.; and Hickleton, Yorkshire.*
1853	*Halkett, Rev. Dunbar S. *Little Bookham, Surrey.*
1853	850*Halkett, Lieut. Peter A., R.N. *Windham Club, S.W.*
1861	Hall, Charles Hall, Esq. *Park-street, Cirencester.*
1863	Hall, Henry, Esq. 109, *Victoria-street, S.W.*
1862	Hall, James Tebbutt, Esq. *Fore-street, Limehouse, E.*
1863	Hall, Thomas F., Esq., F.C.S. 29, *Warwick-square, S.W.*
1853	Hall, Admiral Sir William Hutcheson, K.C.B., F.R.S. *United Service Club, S.W.; and* 48, *Phillimore-gardens, Kensington, W.*
1865	Hallett, Lieut. Francis C. H., R.H.A. *Junior United Service Club, S.W.*
1864	Halliday, Sir Fred., K.C.B. 14, *Queen's-gate-gardens, South Kensington, W.*
1858	Halloran, Arthur B., Esq. *Principal of the South Devon Collegiate School, Heavitree, Exeter.*
1862	Hamilton, Archibald, Esq. *South Barrow, Bromley, Kent, S.E.*
1866	860 Hamilton, Rear-Admiral C. Baillie. 50, *Warwick-square, S.W.*
1861	Hamilton, Lord Claude, M.P. 19, *Eaton-sq., S.W.; and Barons-court, Co. Tyrone.*
1830	*Hamilton, Capt. Henry G., R.N. 71, *Eccleston-square, S.W.*
1861	Hamilton, Col. Robert William, Grenadier Guards. 18, *Eccleston-square, S.W.*
1863	Hamilton, R., Esq. *Care of J. Forster Hamilton, Esq.*, 2, *Gloucester-street, Portman-square, W.*
1830	Hamilton, Terrick, Esq. 121, *Park-street, Grosvenor-square, W.*
1846	Hamilton, Rear-Admiral W. A. Baillie. *Macartney-house, Blackheath, S.E.*
1853	*Hand, Capt. George S., R.N., C.B. *United Service Club, S.W.; and H.M.S. 'Victory.'*
1860	*Handley, Benjamin, Esq., Assistant-Commr. Turko-Persian Frontier. *British Embassy, St. Petersburg; and Grafton Club, Grafton-street, W.*
1866	Hanham, Commr. T. B., R.N. *Manston-house, near Blandford, Dorset.*
1861	870*Hankey, Blake Alexander, Esq. 38, *Portland-place, W.*
1857	Hankey, Thomson, Esq., M.P. 45, *Portland-place, W.*
1837	*Hanmer, Sir J., Bart., M.P., F.R.S. *Hanmer-hall and Bettisfield-park, Flintshire.*
1859	*Hansard, Henry, Esq. 13, *Great Queen-street, W.C.*
1840	*Harcourt, Egerton V., Esq. *Whitwell-hall, York.*
1864	*Hardie, Gavin, Esq. 113, *Piccadilly, W.*
1864	Harding, Charles, Esq., F.R.S.L., F.S.S., F.A.S.L. *Grafton Club*, 10, *Grafton-street, Piccadilly, W.*
1864	Harding, J. J., Esq. 1, *Barnsbury-park, Islington, N.*
1864	Hardinge, Capt. E., R.N. 32, *Hyde-park-square, W.*
1861	Hardinge, Henry, Esq., M.D. 18, *Grafton-street, Bond-street, W.*
1862	880 Hardman, William, Esq., M.A. *Norbiton-hall, Kingston-on-Thames.*

Year of Election.

1864 Hardwick, B. Esq. 157, *Fenchurch-street, E.C.*

1855 Harris, Archdeacon the Hon. C. A. *Bremhill-vicarage, Chippenham.*

1853 Harris, Admiral the Hon. E. A. J., C.B. *H.B.M.'s Envoy Extraordinary and Minister Plenipotentiary, Legation Britannique, Berne. Messrs. Woodhead.*

1852 Harris, George Frederick, Esq., M.A. *Harrow-park, Middlesex, N.W.*

1859 Harris, Capt. Henry, H.C.S. 35, *Gloucester-terrace, Hyde-park, W.*

1865 Harris, John M., Esq. 12, *Holland-terrace, Holland-road, Kensington, W.*

1863 Harrison, Chas., Esq. *Lawrie-park, Sydenham; and* 3, *Great Tower-st., E.C.*

1865 *Harrison, William, Esq., F.S.A., F.G.S., &c. *Conservative Club, S.W.; Royal Thames Yacht Club,* 7, *Albemarle-street, W.; Galligreaves-hall, near Blackburn, Lancashire; and Samlesbury-hall, near Preston, Lancashire.*

1838 Harrowby, Dudley, Earl of. *Sandon-ho., Lichfield; and Norton, Gloucestershire.*

1854 890*Hartland, F. Dixon, Esq., F.S.A., &c. *The Oaklands, near Cheltenham.*

1863 Harvey, Charles, Esq. *Rathgate-cottage, Streatham, S.*

1865 Harvey, C. H., Esq., M.D. 17, *Whitehall-place, S.W.*

1867 Harvey, James, Esq. (Solicitor). *Esk-street, Invercargill, Southland, New Zealand. Care of the Bank of Otago, Old Broad-street, E.C.*

1864 Harvey, John, Esq. *Ickwell Bury, Biggleswade.*

1864 Harvey, John, Esq. 7, *Mincing-lane, E.C.*

1866 Harvey, Richard M., Esq. *Oxford and Cambridge Club, S.W.*

1864 Harvey, W. D., Esq. 52, *Notting-hill-square, S.W.*

1859 Harwood, H. Harwood, Esq. 29, *Cleveland-square, Hyde-park, W.*

1858 Hawker, Edward J., Esq. 37, *Cadogan-place, S.W.*

1834 900 Hawkins, Francis Bisset, Esq., M.D., F.R.S. 29, *Upper Harley-street, W.; and Leweil-lodge, Dorchester.*

1857 Hawkins, Capt. Frank K., R.N. *Army and Navy Club, S.W.*

1840 *Hawkins, John, Esq.

1858 *Hawkins, Col. J. Summerfield, R.E. *Woolwich, S.E.*

1861 Hawksley, Thomas, Esq., C.E. 14, *Phillimore-gardens, Kensington, S.W.*

1860 Haworth, Frederick, Esq.

1852 *Hay, Rear-Admiral Sir J. C. Dalrymple, Bart., M.P., F.R.S. 108, *St. George's-square, S.W.; U. S. Club, S.W.; Dunragit, Glenluce; and Harrow-on-the-hill, N.W.*

1863 *Hay, Lord John. 15, *Cromwell-road, South Kensington, W.*

1865 Hay, Lord William. 2, *Cleveland-row, S.W.*

1859 Hay, Major W. E. *Linden-lodge, Loan-head, near Edinburgh.*

1864 910 Haysman, James, Esq. *Burdett-house, Burdett-road, E.*

1862 Head, Alfred, Esq. 13, *Craven-hill-gardens, Bayswater, W.*

1863 Headlam, Right Hon. Thos. E., M.P. 27, *Ashley-place, Victoria-street, S.W.*

1856 Heath, J. Benj., Esq., F.R.S., F.S.A., Consul for Sardinia. 31, *Old Jewry, E.C.*

1866 Heathcote, Charles George, Esq. 40, *Pall-mall, S.W.*

1863 Heathfield, W. E., Esq. 20, *King-street, St. James's, S.W.*

1861 Hector, Alexander, Esq. 6, *Stanley-gardens, Bayswater, W.*

Year of Election.	
1861	Hector, James, Esq., M.D. *Care of E. Stanford, Esq.*
1862	Hemans, Geo. Willoughby, Esq., C.E. 13, *Queen's-square, Westminster, S.W.*
1856	Henderson, Andrew, Esq. 102, *Gloucester-place, Portman-square, W.*
1837	920*Henderson, James, Esq. *Littlewood-park, Forbes, Aberdeenshire.*
1853	Henderson, John, Esq. *Conservative Club, S.W.; and Valparaiso.*
1866	Henderson, Patrick, Esq. *Care of Captain H. J. Strutt, Royal Mail Steam Packet Company, Southampton.*
1864	Henderson, R., Esq. 7, *Mincing-lane, E.C.*
1852	Henderson, William, Esq. 5, *Stanhope-street, Hyde-park-gardens, W.*
1844	*Heneage, Edward, Esq. *Stag's-end, Hemel Hempstead.*
1861	Henn, Rev. J., B.A., Head Master of the Manchester Commercial Schools. *Old Trafford, Manchester.*
1860	Hennessey, J. B. N., Esq. 1*st Asst. Trig. Survey of India, Dehra in the Dhoon, N.W. Provinces, India. Care of Messrs. Smith, Elder, and Co.*
1838	*Henry, Wm. Chas., Esq., M.D., F.R.S. *Haffield, near Ledbury, Herefordshire.*
1861	*Henty, Douglas, Esq. *Chichester.*
1864	930 Herbert, George, Esq., F.C.P. *University School, near Nottingham.*
1857	Herd, Captain D. J. 2, *Norway-house, Limehouse, E.*
1858	Hertslet, Edward, Esq. *Librarian, Foreign Office, S.W.; and Belle-vue-house, Richmond, S.W.*
1841	Hessey, James Augustus, Esq. *Manningford Bruce, Pewsey, Wilts.*
1861	Heugh, John, Esq. *Tonbridge-wells.*
1840	*Heywood, James, Esq., F.R.S. *Athenæum Club, S.W.; and* 26, *Kensington-palace-gardens, W.*
1860	Heyworth, Capt. Lawrence, 4th Royal Lancashire. *Jun. United Service Club, S.W.*
1853	Hickey, Edwin A., Esq. 29, *King-street, St. James's, S.W.*
1867	Higgins, Edmund Thomas, Esq., M.R.C.S. 9, *Richmond-terrace, Barnsbury, N.*
1856	Hill, Arthur Bowdler, Esq. *South-road, Clapham-park, Surrey, S.*
1866	940 Hill, Berkeley, Esq. 14, *Weymouth-street, Portland-place, W.*
1867	Hill, O'Dell Travers, Esq. 19, *Kildare Terrace, Westbourne Park, W.*
1854	Hill, Lieut.-Colonel Stephen J. *Care of Capt. E. Barnett,* R.N., 14, *Woburn-square, W.; Army and Navy Club, S.W.; and Governor of Antigua.*
1865	Hill, Samuel S., Esq. *Reform Club, S.W.; and* 37, *Sackville-st., Piccadilly, W.*
1861	Hilliard, Major George Towers, Madras Staff Corps. 11, *Lansdowne-road, Kensington-park, Notting-hill, W.*
1858	Hinchliff, T. Woodbine, Esq., Barrister-at-Law. 64, *Lincoln's-inn-fields, W.C.*
1859	Hind, Professor Henry Youle, M.A. *Toronto, Canada West.*
1862	*Hinde, Samuel Henry, Esq. *Windham Club, S.W.*
1846	*Hindmarsh, Frederick, Esq. 4, *New Inn, Strand, W.C.*
1861	Hoare, Deane John, Esq. *Royal Thames Yacht Club, Albemarle-street, W.*
1855	950 Hobbs, Wm. Geo. Ed., Esq. *Master of Grammar School, Wareside, near Ware.*
1830	*Hobhouse, Henry William, Esq. 24, *Cadogan-place, S.W.*
1866	Hockly, John Minett, Esq., R.N. Harbour Master, Shanghai, and Conservator of the Yang-tse-Kiang River. *Plympton St. Mary, Devon.*

Year of Election.	
1856	*Hodgson, Arthur, Esq., Superintendent of the Australian Agricultural Company.
1861	*Hodgson, James Stewart, Esq. 8, *St. Helen's-place, E.C.*
1857	Hodgson, Kirkman Daniel, Esq., M.P. 8, *St. Helen's-place, E.C.*
1856	Hogg, James, Esq. 217, *Piccadilly, W.*
1830	Hogg, John, Esq., M.A., F.R.S., F.L.S., V.-Pres. Royal Society of Literature, &c. 8, *Sergeants'-inn, Temple, E.C.; and Norton-house, Stockton-upon-Tees.*
1865	Hole, Charles, Esq. *Loughborough-house-school, East Brixton, S.*
1839	*Holford, Robert S., Esq., M.P. *Dorchester-house, Park-lane, W.*
1867	Holland, Rev. Fred. Whitmore. 6, *Portsea-place, Connaught-square, W*
1830	Holland, Sir Henry, Bart., M.D., F.R.S. 25, *Lower Brook-street, W.*
1861	Holland, Colonel James. 24, *Prince's-square, Kensington-gardens, W.*
1863	Holland, Loton, Esq. 6, *Queen's-villas, Windsor.*
1862	Holland, Robert, Esq. *Stanmore-hall, Great Stanmore, Middlesex.*
1861	*Hollingsworth, John, Esq., M.R.C.S. *Maidenstone-house, Greenwich, S.E.*
1861	Holme, J. Wilson, Esq., M.A. *Downswood, Beckenham, Kent, S.E.*
1835	*Holmes, James, Esq. 4, *New Ormond-street, Queen-square, W.C.*
1862	Holmes, Sir William H.
1861	Holms, John, Esq. 16, *Cornwall-gardens, Queen's-gate, W.*
1839	*Holroyd, Arthur Todd, Esq., M.D., F.L.S. *Athenæum Club, S.W.*
1857	Holroyd, Henry, Esq. Barrister-at-Law. 2, *Elm-court, Temple, E.C.*
1864	Holt, Vesey, Esq. 63, *Warwick-square, W.*
1857	Homfray, William Henry, Esq. 6, *Storey's-gate, S.W.*
1865	Honeywood, Robert, Esq. *Manor-house, Wethersfield, Braintree; Windham Club, S.W.*
1864	*Hood, Sir Alex. Acland, Bart., M.P. *St. Andrie's-park, Bridgewater, Somerset.*
1862	Hood, Henry Schuback, Esq. *War Office, S.W.; and* 10, *Kensington-park-gardens, W.*
1861	Hood, T. H. Cockburn, Esq. *Stoneridge, Berwickshire.*
1859	*Hood, William Charles, Esq., M.D. *Bethlehem Hospital, S.*
1866	*Hooker, Joseph, Esq., M.D., F.R.S., F.L.S., &c. *Director of the Royal Gardens, Kew.*
1861	Hopcraft, George, Esq. 3, *Billiter-square, E.C.*
1846	*Hope, Alex. James Beresford, Esq., M.P. *Arklow-house, Connaught-place, Hyde-park, W.; and Bedgebury-park, Hurst-green, Kent.*
1862	Hope, Capt. C. Webley, R.N. *H.M.S. 'Brisk,' Australia; Messrs. Hallett & Co.*
1861	Hoskins, Capt. A. H., R.N. *Army and Navy Club, S.W.*
1859	Hoskyns, Chandos Wren, Esq. *Wraxhall-abbey, Warwickshire.*
1853	Houghton, Lord. 16, *Upper-brook-street, W.; The Hall, Bawtry; and Fryston-hall, Ferrybridge, Yorkshire.*
1856	Hovell, William Hilton, Esq. *Goulburn, New South Wales. Care of Mr. W. Chamberlin,* 74, *Fleet-street, E.C.*
1864	Howell, W. G., Esq.
1853	Howard, Sir Ralph, Bart. 17, *Belgrave-sq., S.W.; and Bushy-park, Wicklow.*
1857	Howard, Samuel Lloyd, Esq. *Goldings, Loughton, Essex.*

Year of Election.

1842 990*Hubbard, J. Gellibrand, Esq., M.P. 24, *Prince's-gate, Hyde-park, S.W.*
1867 *Hubbard, William Egerton, Esq. *St. Leonard's-lodge, Horsham.*
1867 *Hubbard, William Egerton, Esq., Jun., R.A. *St. Leonard's-lodge, Horsham.*
1857 Hughes, Capt. Sir Frederic. *Ely-house, Wexford.*
1838 Hughes, William, Esq. 63, *Oakley-square, St. Pancras, N.W.*
1838 *Hume, Edmund Kent, Esq.
1860 *Hume, Hamilton, Esq. *Cooma Yass, New South Wales. Care of Rev. A. Hume*, 24, *Fitzclarence-street, Liverpool.*
1861 Hunt, George S. Lennox, Esq., H.B.M. Consul, *Pernambuco.*
1866 Hunt, Joseph, Esq. *Cave-house Uxbridge, Middlesex.*
1865 Hunt, Capt. Thomas, R.H.A. *The Barracks, Maidstone.*
1857 1000Hunt, Zacharias Daniel, Esq. *Aylesbury.*
1862 Hunter, Henry Lannoy, Esq. *Beech-hill, Reading.*
1864 Hutchinson, Capt. R. R. 12, *Mornington-road, Bromley, Middlesex.*
1858 Hutchinson, Thomas J., Esq., F.R.S.L., F.E.S., F.A.S.L., H.B.M. Consul, *Rosario, Argentine Republic. Care of J. B. Alston, Esq., Foreign-office.*
1860 *Hyde, Captain Samuel. 8, *Billiter-square, E.C.*

1865 Illingworth, Rev. Edward A. 3, *Mecklenburg-street, W.C.*
1852 Illingworth, Richard Stonhewer, Esq. 9, *Norfolk-crescent, Hyde-park, W.*
1850 *Imray, James Frederick, Esq. 102, *Minories, E.; and Beckenham, Kent, S.E.*
1861 *Ingall, Samuel, Esq. *Forest-hill, Kent, S.E.*
1860 Ingilby, the Rev. Sir Henry John, Bart. *Ripley-castle, Ripley, Yorkshire.*
1851 1010Inglefield, Captain Edward A., R.N., F.R.S. *United Service Club, S.W.; and* 10, *Grove-end-road, St. John's Wood, N.W.*
1846 Ingram, Hughes Francis, Esq. *University Club, S.W.*
1860 *Inskip, G. H., Esq., Master R.N. *H.M. Surveying Vessel 'Porcupine;' and* 6, *Park-place-west, Sunderland.*
1852 *Inskip, Rev. Robert Mills. 8, *Boon's-place, Plymouth.*
1840 *Irby, Frederick W., Esq. *Athenæum Club, S.W.*
1864 *Irving, John, Esq.
1853 Irving, Thomas, Esq. 46, *Marquess-road, Canonbury, N.*
1861 Irwin, James V. H. 8, *Duke-street, St. James's, S.W.*
1864 Ives, W. F., Esq. *St. John's School, Limehouse, E.*
1865 Izard, Frederick, Esq., 141, *High Holborn, W.C.*

1866 1020Jackson, Robert Ward, Esq. 28, *Inverness-road, Hyde-park, W.*
1855 Jackson, William, Esq., M.P. 10, *Mansfield-street, W.*
1862 Jacomb, Thomas, jun., Esq. 23, *Old Broad-street, Gresham-house, E.C.*
1866 James, Major Geo. A. 22, *Essex-street, Strand, W.C.*
1857 James, Colonel Sir Henry, R.E., F.R.S. *Director of the Ordnance Survey, Southampton.*

Year of Election.	
1861	James, William Bosville, Esq. 13, *Blomfield-road, Maida-hill, W.*
1862	*Jaques, Leonard, Esq. *Wentbridge-house, Pontefract, Yorkshire.*
1863	*Jardine, Andrew, Esq. *Lanrick-castle, Stirling.*
1863	*Jardine, Robert, Esq., M.P. *Castlemilk, Lockerby, N.B.*
1857	Jefferson, Richard, Esq. A4, *The Albany, W.*
1865	1030Jeffreys, J. G., Esq. 25, *Devonshire-place, W.*
1860	*Jejeebhoy, Sir Jamsetjee, Bart. *Bombay.*
1854	Jellicoe, Charles, Esq. 12, *Cavendish-place, W.*
1859	Jencken, H. Diedrich, Esq. 1, *Brick-court, Temple, E.C.; and* 2, *York-terrace, Upper Sydenham, S.E.*
1854	Jenkins, Capt. Griffith, I.N., C.B. *East India Club, St. James's-square, S.W., and Derwen, Welch Pool, Montgomeryshire.*
1837	*Jenkins, R. Castle, Esq. *Beachley, near Chepstow.*
1854	*Jennings, William, Esq., M.A. 13, *Victoria-street, Westminster, S.W.*
1860	Jermyn, Rowland Formby, Esq. *War Office, S.W.*
1860	Jessopp, Rev. Augustus, M.A., Head Master, King Edward VI. School. *Norwich.*
1864	*Jeula, Henry, Esq. *Lloyd's, E.C.*
1864	1040*Jeyes, F. F., Esq. *Castle-hill, Ealing, W.*
1847	Johnson, Edmund Chas., Esq. C3, *Albany, Piccadilly, W., and* 6, *Savile-row, W.*
1859	*Johnson, Henry, Esq. 39, *Crutched-friars, E.C.*
1854	Johnson, John Hugh, Esq.
1861	Johnson, William, Esq., R.N. *Junior Carlton Club, S.W.*
1866	Johnson, W. H., Esq., Civil Assistant G. T. S. India. *Dehra Dun, N.W. Provinces, India.*
1843	Johnston, Alex. Keith, Esq., F.R.S.E., Hon. Mem. Berl. Geog. Soc., &c. *March-hall-park; and* 4, *St. Andrew-square, Edinburgh.*
1856	Johnston, A. R., Esq., F.R.S. *Athenæum Club, S.W.*
1857	Johnston, J. Brookes, Esq. 29, *Lombard-street, E.C.*
1866	Johnstone, Major H. C. *Murree, Punjab, India.*
1867	1050*Johnstone, John, Esq. *Castlenow-house, Mortlake, S.W.*
1853	Johnstone, Sir John V. B., Bart., M.P., D.C.L. 34, *Belgrave-square, W.; and Hackness-hall, near Scarborough.*
1858	Jones, Capt. Edward Monckton, 20th Regt. *Adjutant, Staff College, near Farnboro' Station, Hants.*
1864	Jones, Capt. Felix. *Fernside, Church-road, Weston-hill, Upper Norwood, S.*
1857	Jones, Lt.-Colonel Jenkin, Royal Engineers. 1, *Lennard-place, Circus-road, St. John's-wood, N.W.; and India.*
1862	Jones, John, Esq. 338, *Strand, W.C.*
1861	Jones, John Pryce, Esq. *Grove-park School, Wrexham.*
1861	Jones, Sir Willoughby, Bart. *Cranmer-hall, Fakenham, Norfolk.*
1867	*Jordan, Wm. Leighton, Esq. 1, *Powis-square, Notting-hill, W.*
1863	Joshua, Moss, Esq. *Melbourne; and* 22, *Clifton-gardens, Maida-hill, W.*
1863	1060Jourdain, Frederick John, Esq. 10, *Austin-friars, E.C.*

Year of Election.

1858 Kay, David, Esq. 17, *Abingdon-terrace, Kensington, W.*

1865 Kaye, J. W., Esq. *India Office, S.W.*

1866 *Kean, Charles, Esq. 30, *George-street, Hanover-square, W.*

1860 Keate, R. W., Esq., Lieutenant-Governor, *Trinidad.*

1857 Keating, Sir Henry Singer, Q.C., one of the Judges of the Court of Common Pleas. 11, *Prince's-gardens, S.W.*

1857 Keene, Rev. C. E. Ruck. *Swynscombe-park, Henley-upon-Thames.*

1863 Keir, Simon, Esq. *Conservative Club, S.W.*

1845 *Kellett, Rr.-Adm. Henry, C.B. *Clonmel, Ireland.*

1861 Kelly, William, Esq. *Royal Thames Yacht Club, 7, Albemarle-street, W.*

1860 1070*Kemball, Col. Arnold Burrowes, C.B., Indian Army. *H.M.'s Consul-General, Bagdad; and 6, Chester-place, Hyde-park, W.*

1863 Kempster, J., Esq. 1, *Portsmouth-place, Kennington-lane, Surrey, S.*

1861 Kennard, Adam Steinmetz, Esq. 7, *Fenchurch-street, E.C.*

1859 Kennard, Coleridge J., Esq. 14, *Lombard-street, E.C.*; *and* 13, *Prince's-terrace, Prince's-gate, S.W.*

1861 Kennard, Robert William, Esq., M.P. 37, *Porchester-terrace, Hyde-park, W.*

1861 Kennedy, Edward Shirley, Esq. *Esher, Surrey.*

1854 Kennedy, Rev. John, M.A. 4, *Stepney-green, E.*

1863 Kerr, J. H., Esq., R.N. *Hydrographic-office, S.W.*

1867 Kerr, Robt. M., Esq., Judge of the Sheriffs' Court, *City.*

1864 Kerr, Lord Schomberg. 15, *Bruton-street, W.*

1862 1080Kershaw, Wm., Esq. 16, *St. Mary Axe, E.C.; and Suffolk-lodge, Brixton-road, S.*

1859 Key, Admiral Astley Cooper, R.N., C.B. *United Service Club, S.W.*

1862 Key, J. Binney, Esq. *Oriental Club, W.*

1857 Keysell, Francis P., Esq. *Sycamore-villa, 35, Carlton-hill, St. John's-wood, N.W.*

1864 *Kiddle, W. W., Esq.

1864 Kimber, Dr. E. *Murchison-house, Dulwich, S.*

1846 King, Lieut.-Colonel Edward R., 36th Regt. *Junior United Service Club. S.W.*

1866 King, John, Esq. *The Rushetts, Thames Ditton, Surrey.*

1858 King, Rev. Samuel W., A.M. *Saxlingham-rectory, Norwich.*

1861 King, Major W. Ross, Unatt., F.S.A. Scot. *Tertowie, Kinellar, Aberdeenshire; and Army and Navy Club, S.W.*

1857 1090*Kinnaird, Hon. Arthur F., M.P. 2, *Pall-mall-east, S.W.*

1867 Kinnaird, George William Fox, Lord, K.G. *Rossie-priory, Inchture, N.B.*; *and* 33, *Grosvenor-street, W.*

1860 Kinns, Samuel, Esq., PH. DR., F.R.A.S. *Highbury-new-park College, N.*

1858 Kirk, John, Esq., M.D. 45, *George-square, Edinburgh.*

1863 Kirke, John, Esq., Barrister. *C. Thorold, Esq., Welham, Retford, Notts.*

1861 Kirkland, Sir John. 17, *Whitehall-pl., S.W.; and Foot's-cray-pl., Kent, S.E.*

1866 *Kitson, James, Jun., Esq. *Hanover-square, Leeds.*

1835 *Kjaer, Thomas Andreas, Esq. *Hjornet af Konyins Nyetow og Gathersgaden* No. 26, 3*d Sahl, Copenhagen.*

Year of Election.	
1867	Knight, Andrew Halley, Esq. 76, *Westbourne-terrace, Hyde-park, W.*
1862	Knollys, Lieut.-General W. T., V.-Pres. Council of Military Education. *Eaton-square, S.W.*
1867	Knox, Alex. A., Esq. 91, *Victoria-street, Westminster, S.W.*
1861	1100Knox, Thomas G., Esq. *India. Care of Messrs. Smith, Elder, and Co.*, 45, *Pall-mall, S.W.*
1866	Kopsch, Henry, Esq. *Custom-house, Shanghai. Care of H. C. Batchelor, Esq.*, 155, *Cannon-street, E.C.*
1861	Kyd, Hayes, Esq., M.R.C.S. *Wadebridge, Cornwall.*
1859	Labrow, Lieut.-Colonel Valentine H., F.S.A., F.G.S. *Mitre-court-chambers, Temple, E.C.; and Club-chambers, S.W.*
1849	*Laffan, Capt. Robert Michael, R.E. *Army and Navy Club, S.W.; and Otham-lodge, Kent.*
1859	Lamb, Lieut. Henry, I.N. *H.M. India Store Department, Belvedere-road, Lambeth, S.*
1863	*Lambert, Alan, Esq. *Heath-lodge, Putney-heath, S.W.*
1864	Lambert, Charles, Esq. 2, *Queen-street-place, Upper Thames-street, E.C.*
1867	Lambert, Wm. Blake, Esq., C.E. 21, *Queen Anne-street, Cavendish-square, W.*
1864	1110Lamert, Capt. G. F. 20, *Albemarle-street, W.*
1861	Lamont, James, Esq., M.P. E 1, *Albany, W.*
1866	Lampray, John, Esq. 16, *Camden-square, N.W.*
1865	Lampray, Thomas, Esq. *Warrior-lodge, The Grove, Hammersmith, W.*
1867	Lamprey, Jones, Esq., M.B., 67th Regt. *Waterford, Ireland.*
1864	Lampson, C. M., Esq. 64, *Queen-street, Cheapside, E.C.*
1838	*Lance, John Henry, Esq., F.L.S. *The Holmwood, Dorking.*
1861	*Lang, Andrew, Esq. *Dunmore, Hunter-river, New South Wales; and Dunmore, Teignmouth, Devon.*
1859	*Lange, Daniel A., Esq. 21, *Regent-street, W.*
1867	Langlands, John, Esq., Engineer. *Melbourne, Australia.*
1865	1120Langley, Edward, Esq. *Well-hall, Eltham, Kent.*
1833	*Larcom, Maj.-General Sir Thomas Aiskew, R.E., K.C.B., F.R.S. *Castle, Dublin.*
1861	Lardner, Col. John. *United Service Club, S.W.*
1859	Larnach, Donald, Esq. 21, *Kensington-palace-gardens, W.*
1854	Latrobe, Ch. J., Esq. *Whitbourne-court, Worcester.*
1862	*Laurie, John M., Esq. 4, *St. George's-place, S.W.; and Maxwaelton-house, Thornhill, Dumfriesshire.*
1846	*Law, Hon. H. Spencer, M.A. 1, *Lowndes-st., S.W.; and Ellington-ho., Ramsgate.*
1830	Law, William J., Esq. 63, *Upper Seymour-street, W.*; 33, *Lincoln's-inn-fields, W.C.; and* 5, *Sussex-square, Brighton.*
1861	Lawrence, Edward, Esq. *Beechmont, Aigburth, Liverpool.*
1867	Lawson, Wm., Esq. 21, *Walham Grove, Fulham, S.W.*
1862	1130*Lay, Horatio, N., Esq., Commissioner of Foreign Customs in China.
1857	Layard, Austen H., Esq., M.P., D.C.L. 130, *Piccadilly, W.*

Year of Election.	
1866	*Layard, Lieutenant Brownlow Villiers (3rd W. India Regt.). 38, *Upper Mount-street, Dublin; and Lane's Hotel*, 1, *St. Alban's-place, S.W.*
1863	*Leaf, Chas. J., Esq. *Old-change, E.C.; and The Rylands, Norwood, S.*
1861	*Learmonth, Dr. John. *Parkhall, near Linlithgow.*
1866	Lebour, G. A., Esq. 6, *Addison-crescent, Kensington, W.*
1853	*Le Breton, Francis, Esq. 21, *Sussex-place, Regent's-park, N.W.*
1865	Le Feuvre, W. H., Esq., C.E. 18, *Great George-street, S.W.*
1861	Leckie, Patrick C., Esq. 7, *Palace-road, Roupell-park, Streatham, S.*
1839	Lee, Thomas, Esq. *Royal Institution, Albemarle-street, W.*
1833	1140*Lefevre, Sir John George Shaw, M.A., D.C.L., F.R.S., Vice-Chancellor of the University of London. 8, *Spring-gardens, S.W.*
1853	Lefroy, General John Henry, R.A., F.R.S. *Royal Arsenal, Woolwich, S.E.*
1862	Leggatt, Clement Davidson, Esq. 43, *Inverness-terrace, W.*
1861	Legh, Wm. John, Esq. 37, *Lowndes-square, S.W.; and Lyme-park, Cheshire.*
1861	*Lehmann, Frederick, Esq. 139, *Westbourne-terrace, W.*
1845	Leigh, John Studdy, Esq., F.G.S. *Care of S. Herapath, Esq.*, 4, *Angel-court, Throgmorton-street, E.C.*
1863	Le Mesurier, Henry P., Esq., C.E. *St. Martin's, Guernsey.*
1863	Le Messurier, M.-Gen. A. P. 2, *Stanhope-terrace, Hyde-park, W.*
1836	Lemon, Sir Charles, Bart., F.R.S., &c. *Carclew, near Falmouth, Cornwall.*
1857	*Lenox, George Wm., Esq. 34, *Portland-place, W.; and Pont-y-Pridd, Glamorganshire.*
1856	1150Leslie, the Hon. G. W. 4, *Harley-street, W.*
1859	Leslie, Walter D., Esq. *Arthur's Club, St. James's-street, S.W.*
1866	Lester, Dr. C. S., R.N. 8, *Chepstow-place, Bayswater, W.*
1867	L'Estrange, Carleton, Esq. *Carlton Club, S.W.*
1840	*Letts, Thomas, Esq. 8, *Royal Exchange, E.C.*
1863	Leveaux, E. H., Esq. 25, *The Cedars, Putney, S.W.*
1857	Leverson, George B. C., Esq. 73, *Gloucester-terrace, Hyde-park, W.*
1862	Levick, Joseph, Esq. 8, *Great Winchester-street, Old Broad-street, E.C.*
1866	Levinge-Swift, Richard, Esq. *Levinge-lodge, Richmond, Surrey.*
1859	Levinsohn, Louis, Esq. 7, *Finsbury-square, E.C.*
1865	1160Lèvy, William Hanks, Esq. *Institution of the Association for the Welfare of the Blind*, 210, *Oxford-street, W.*
1852	Leycester, Captain Edmund M., R.N. 5, *Carton-place, Westbourne-park-road, Bayswater, W.*
1861	Leyland, Luke Swallow, Esq. *The Leylands, Hatfield, Doncaster.*
1859	Lichfield, Thomas George, Earl of. *Shugborough, Staffordshire.*
1856	Lilford, Thomas Lyttleton Powys, Lord. 10, *Grosvenor-place, W.*
1860	Lindsay, H. Hamilton, Esq.
1857	Lindsay, Major-General the Hon. J., Grenadier Guards, M.P. 20, *Portman-square, W.*
1867	*Lindsay, Col. Robert J. L., M.P., V.C. *Lockinge-house, Wantage, Berks; and* 2, *Carlton-gardens, S.W.*

Year of Election.	
1855	*Lindsay, Wm. S., Esq. *Manor-house, Shepperton, Middlesex.*
1858	Lister, John, Esq.
1866	1170Little, Archibald J., Esq. 34, *Brook-street, Grosvenor-square, W.*
1857	*Lloyd, George A., Esq. 2, *Royal Exchange-buildings, E.C.*
1863	Lloyd, Sir Thomas Davis, Bart., M.P. *United University Club S.W.; and Bronwydd, Carmarthen.*
1864	Lloyd, W., Esq. *Moor-hall, near Sutton Coldfield.*
1867	Lloyd, Rev. Wm. V., M.A. 16, *Lancaster-gate, W.*
1861	Lluellyn, Capt. Richard. 20, *Montagu-square, W.*
1863	Loch, George, Esq. 12, *Albemarle-street, W.*
1859	Loch, Henry Brougham, Esq. *Government-house, Isle of Man.*
1861	Loch, John Charles, Esq. 12, *Albemarle-street, W.; and Hong-Kong.*
1857	Loch, William Adam, Esq. 8, *Great George-street, Westminster, S.W.*
1864	1180Locke, John, Esq. 83, *Addison-road, Kensington, W.*
1858	Lockhart, William, Esq., F.R.C.S. *Park-villas, Granville-park, Blackheath, S.E.; and China.*
1860	Lockwood, James Alfred. *United Arts Club, Hanover-square, W.*
1856	*Logan, Sir William Edmond, F.R.S. *Montreal, Canada.*
1860	Londesborough, Wm. Henry Forester, Lord. *Thomas's-hotel, 25, Berkeley-sq., W.*
1830	Long, George, Esq., M.A. 22, *Buckingham-street, Brighton.*
1839	*Long, Henry L., Esq. *Travellers' Club, S.W.; and Hampton-lodge, Farnham, Surrey.*
1857	*Long, W. Beeston, Esq.
1858	Longden, Morrell D., Esq. 4, *Ennismore-place, Hyde-park, S.W.*
1865	*Longley, Major George, R.E. *Lambeth Palace.*
1847	1190Longman, Thos., Esq. *Paternoster-row, E.C.; and 8, Sussex-sq., Hyde-park, W.*
1858	Longman, William, Esq. 36, *Hyde-park-square, W.*
1861	Lonsdale, Arthur Pemberton, Esq.
1860	Looker, William Robert, Esq. *Melbourne, Australia; care of Mr. Ashhurst, 16, Bishopsgate-street-within, E.C.*
1863	Lovell, Capt. 6, *Granville-park-villas, Blackheath, S.E.*
1856	Lovett, Phillips Cosby, Esq. *Liscombe-ho., Liscombe, Leighton Buzzard, Bucks.*
1867	Low, Alex. F., Esq. 84, *Westbourne-terrace, W.*
1861	Low, Robert, Esq. 17, *Woburn-square, W.C.*
1863	Low, S. P., Esq. 55, *Parliament-street, S.W.*
1858	Lowden, Rev. George Rouse. *Brent-villa, Hanwell, Middlesex.*
1859	1200Lowe, Capt. W. Drury. *Myria, Bettws-y-Coed, Llanrwst, North Wales.*
1863	Lowndes, E. C., Esq. 84, *Eaton-place, S.W.*
1830	Lowry, Joseph Wilson, Esq. 45, *Robert-street, Hampstead-road, N.W.*
1860	Loyd, Col. W. K. *Union Club, S.W.*
1866	Luard, Wm. Charles, Esq. *Llandaff-house, Cardiff; and Athenæum Club, S.W.*
1860	Luke, William, Esq., Bengal Civil Service. 93, *Inverness-terr., Hyde-park, W.*
1860	Lumsden, Rev. Robert Comyn, M.A. *Cheadle, Manchester.*
1860	Lush, Robert, Esq., Q.C. *Balmoral-house, Avenue-road, Regent's-park, N.W.*

Year of Election.	
1866	Lydall, J. H., Esq. 12, *Southampton-buildings, Chancery-lane, W.C.*
1830	*Lyell, Sir Charles, Bart., M.A., LL.D., F.R.S. 73, *Harley-st., Cavendish-sq., W.*
1837	1210*Lynch, Capt. H. Blosse, I.N., C.B., F.R.A.S. *Athenæum Club, S.W.*
1861	*Lynch, Thomas Kerr, Esq. 31, *Cleveland-square, Hyde-park, W.*
1858	Lyne, Francis, Esq.
1862	*Macarthur, Major-Gen. Sir Edward, K.C.B. 27, *Prince's-gardens, W.*
1863	Macbraire, James, Esq. *Broadmeadows, Berwick-on-Tweed.*
1862	Macdonald, Chessborough C., Esq. 32, *Belsize-park, Hampstead, N.W.*
1843	Macdonnell, Sir Richard Graves, C.B., late Governor of S. Australia.
1863	Macfarlan, George, Esq. *Christ-church, Canterbury, New Zealand.*
1865	Macfarlan, John G., Esq. *Clyde-villa, Anerley-hill, Upper Norwood.*
1865	Macfie, Rev. M. *Moseley-road, Birmingham.*
1861	1220Mackintosh, Alexander Brodie, Esq. *Oriental Club, W.; and Dunoon, Scotland.*
1839	Macintosh, Lieut.-General Alex. Fisher, K.H.
1845	*Macintyre, Patrick, Esq., F.S.A., Off. Assoc. Inst. Act.
1859	Mackay, Rev. Alexander, A.M. *Free Manse, Rhynie, Aberdeenshire.*
1859	*Mackean, Thos. W. L., Esq. 24, *Oxford-square, Hyde-park, W.*
1862	Mackenzie, Colin J., Esq. *Windham Club, S.W.*
1845	Mackenzie, Right Hon. Holt, F.R.A.S. *Athenæum Club, S.W.; and* 28, *Wimpole-street, W.*
1861	Mackenzie, Sir James J. Randall, Bart. *Travellers' Club, S.W.; and Seatwell, Rosehaugh, Munlochy, N.B.*
1860	*Mackenzie, James T., Esq. 69, *Lombard-street, E.C.*
1863	Mackenzie, John H., Esq. *Wallington, Carshalton, Surrey.*
1864	1230*Mackeson, Edward, Esq. 59, *Lincoln's-inn-fields, W.C.*
1830	Mackillop, James, Esq., F.R.A.S. 30, *Grosvenor-square, W.*
1862	Mackinly, D., Esq. *Oriental Club, W.*
1864	Mackinnon, C. D., Esq. *Care of Messrs. J. Clinch and Sons,* 31, *Abchurch-lane, E.C.*
1861	Mackinnon, Lachlan, Esq. *Menabilly, Par-Cornwall; and Reform Club, S.W.*
1855	*Mackinnon, Wm. Alex., Esq., M.P., F.R.S. 4, *Hyde-park-place, W.*
1865	*Mackinnon, W., Esq. 150, *Hope-street, Glasgow.*
1860	Mackirdy, Lt.-Col. Elliot, 69th Rgt. *U.S. Club, S.W.; and Tonghoo, Birmah.*
1860	Maclean, William Crighton, Esq., F.G.S., 5, *Camperdown-ter., Great Yarmouth.*
1859	MacLeay, George, Esq. 35, *Hyde-park-gardens, W.*
1867	1240Macloughlin, David, Esq., M.D., Member of Legion of Honour, &c. 36, *Bruton-street, Berkeley-square, W.*
1855	Maclure, Andrew, Esq. *Maclure, Macdonald, and Macgregor,* 37, *Walbrook, E.C.*
1861	Maclure, John William, Esq. 2, *Bond-street, Manchester.*
1860	Macmillan, Alex., Esq. 16, *Bedford-street, Covent-garden, W.C.*
1865	Mackmurdo, G. W., Esq. 7, *New Broad-street, E.C.*
1855	Macnab, John, Esq.
1861	Macpherson, William, Esq. 32, *Lancaster-gate, W.*
1845	*Macqueen, James, Esq., K.C. Tower and Sword of Portugal. 4, *Alma-terrace, Hammersmith, W.*

Year of Election.	
1864	Macrae, Colin W., Esq. *Oriental Club, Hanover-square, W.*
1865	Mactaggart, Malcolm, Esq. *Sydney, New South Wales.*
1863	1250McArthur, Alex., Esq. *Raleigh-hall, Brixton-rise, Brixton, S.*
1867	McArthur, William, Esq. 1, *Guyder-houses, Brixton-rise, S.*
1860	McClintock, Capt. Sir Francis Leopold, R.N. *United Service Club, S.W.*
1861	*McConnell, W. R., Esq., Barrister-at-Law. 12, *King's-bench-walk, E.C.; and Charleville, Belfast.*
1862	McCosh, John, Esq., M.D. *Junior United Service Club, S.W.*
1855	*M'Clure, Captain Sir Robert J. le M., R.N. *Chipperfield, Herts; and Athenæum Club, S.W.*
1865	McDonald, James, Esq. *Oriental Club, Hanover-square, W.*
1865	McEuen, D. P., Esq. 24, *Pembridge-square, Bayswater, W.*
1865	McEwan, James, Esq. 30, *Holland-park, Kensington, W.*
1865	McGoun, Colonel T., *Controller of Military Finance, Bangalore, Madras.*
1855	1260McGregor, Duncan, Esq. *Board of Trade, S.W.; and Athenæum Club, S.W.*
1867	McGregor, Duncan, Esq. *Clyde-place, Glasgow.*
1866	*McIvor, W. G., Esq., *Superintendent of Chinchona Plantations, Ootacamund, Madras.*
1858	McKerrell, Robert, Esq. 45, *Inverness-terrace, W.; and Mauritius.*
1852	M'Leod, Walter, Esq. *Head Master of the Royal Military Asylum, Chelsea, S.W.*
1866	McNair, Capt. John F. A., R.A.
1839	M'Neil, The Right Hon. Sir John, G.C.B. *Granton, near Edinburgh.*
1867	Mackinlay, John, Esq., J.P., M.I.C.E., Chief Engineer and Inspector of Machinery, H.M. Dockyard, and Surveyor to the Port, Bombay. 13, *Dorset-terrace, Clapham-road.*
1859	Maitland, Geo. Gammie, Esq, *Shotover-house, Wheatley, Oxon.*
1845	*Major, Richard Henry, Esq., F.S.A. *British Museum, W.C.*
1858	1270Malby, John Walter, Esq. 15, *Richmond-villas, Seven-sisters'-rd., Holloway, N.*
1853	*Malby, Thomas, Esq. 2, *Park-villas, Seven-sisters'-road, Holloway, N.*
1862	*Malcolm, Capt. Edward Donald, R.E. *Chatham.*
1863	Malcolm, Jas., Esq. 22, *Prince's-gate, Knightsbridge, W.*
1843	*Malcolm, W. E., Esq. *Burnfoot, Langholme, near Carlisle.*
1853	*Mallet, Charles, Esq. *Audit Office, W.C.; and Belmont, Hampstead, N.W.*
1836	*Manchester, Rt. Rev. James Prince Lee, Bishop of, F.R.S., &c. *Athenæum Club, S.W.; and Sedgley-hall, Manchester.*
1860	Mann, James Alexander, Esq., M.R.A.S. *Kensington-palace, W.*
1866	Mann, Robert James, Esq., M.D. 12, *Cecil-street, Strand, W.C.*
1866	Manners, Geo., Esq., F.S.A. *Lansdowne-road, Croydon.*
1856	1280Manning, Frederick, Esq. *Byron-lodge, Leamington; and 8, Dover-street, W.*
1864	*Mansell, Commander A. L. *H.M.S. 'Hydra;' care of the Hydrographic-office, Admiralty, S.W.*
1859	Mantell, Walter Baldock Durant, Esq. *Wellington, New Zealand. Care of E. Stanford, Esq.*
1860	Mariette, Prof. Alphonse, M.A. 27, *St. Stephen's-square, Bayswater, W.*

Year of Election.

1830 *Marjoribanks, Edward, Esq. 34, *Wimpole-street, W.*

1854 Markham, Clements Robert, Esq. *India Office, S.W.; and* 21, *Eccleston-sq. S.W.*

1857 Marlborough, George, Duke of. *Blenheim, Woodstock. Care of E. Stanford, Esq.*

1864 Marsden, Rev. Canon J. H. *Higher Broughton, Manchester.*

1857 Marsh, Matthew Henry, Esq., M.P. *Oxford and Cambridge Club, S.W.; and* 41, *Rutland-gate, S.W.*

1862 Marshall, Capt. J. G. Don. 46, *Gloucester-square, Hyde-park, W.*

1854 1290Marshall, Jas. Garth, Esq. *Headingley, nr. Leeds; and Monk Coniston, Ambleside.*

1862 Marshall, William, Esq. 4, *Paper-buildings, Inner Temple, E.C.*

1859 *Marsham, the Hon. Robert. *The Mote, Maidstone, Kent.*

1857 Marshman, J. C., Esq. 7, *Kensington-palace-gardens, W.*

1867 Marthin, Guillermo E. de, Con.-General United States of Columbia. 13, *Bessborough-street, Pimlico, S.W.*

1857 Martin, Francis P. B., Esq.

1861 Martin, Henry, Esq. *Sussex-house, Highbury-new-park, N.*

1860 *Martin, Richard Biddulph, Esq. *Clarewood, Bickley, S.E.*

1862 Martin, Thomas, Esq. 5, *Compton-terrace, N.*

1867 Martin, Wm., Esq. 37, *Cleveland-square, Paddington, W.*

1865 1300Masarvon, Wm. R., Esq.

1845 *Matheson, Sir James, Bart., M.P., F.R.S. 13, *Cleveland-row, S.W.; and Achany, Bonar-bridge, Sutherlandshire, &c.*

1858 Mathieson, James Ewing, Esq. 77, *Lombard-street, E.C.; and* 16, *Queen's-gardens, Bayswater, W.*

1860 *Maxwell, Sir William Stirling, Bart., M.P. 128, *Park-street, Grosvenor-square, W.*

1855 May, Daniel John, Esq., R.N. *Cape of Good Hope. Care of Case and Loudensack.*

1858 Mayer, Joseph, Esq., F.S.A. 68, *Lord-street, Liverpool.*

1861 Mayers, William S. F., Esq., Interpreter to H.M. Consulate. *Shanghai. Care of F. J. Angier, Esq.*, 12, *George-yard, Lombard-street, E.C.*

1867 Mayhew, Rev. Samuel Martin. 158, *New Kent-road, S.*

1862 Mayne, Captain Richard Charles, R.N. *H.M.S. 'Eclipse;' and* 80, *Chester-square, S.W.*

1858 Mayo, Capt. John Pole. *Army and Navy Club, S.W.*

1867 1310Mayson, John S., Esq. (J. P. for county of Lancashire). *Oakhill, Fallowfield, near Manchester.*

1863 Meade, the Hon. Robert Henry. *Foreign Office, S.W.; and* 3, *Belgrave-sq. S.W.*

1862 *Medlycott, Lieut. Mervyn B., R.N. *Care of Messrs. Woodhead.*

1860 *Meinertzhagen, Daniel, Esq. 10, *Moorgate-street, E.C.; and* 28, *Devonshire-place, Portland-place, W.*

1865 Meller, Charles James, Esq., M.D. 48, *Queen Anne-street, Cavendish-square, W.*

1854 Melvill, Col. Sir Peter Melvill, Mil. Sec. to the Bombay Gov. 27, *Palmeira-square, Brighton.*

1838 Melvill, Philip, Esq., F.R.A.S. *Ethy-house, Lostwithiel, Cornwall.*

1863 Mercier, Rev. J. J. *Hanwell, W.*

Year of Election.	
1842	*Merivale, Herman, Esq., C.B., Under Sec. of State for India. *India Office, S.W.; and* 26, *Westbourne-terrace, W.*
1866	Messiter, Charles A., Esq. *Barwick, near Yeovil, Somerset.*
1867	1320Metcalfe, Frederic Morehouse, Esq. *Wisbech, Cambridgeshire.*
1837	*Mexborough, John Chas. Geo. Earl of. 33, *Dover-street, W.; and Methley-park, near Leeds.*
1865	*Michell, Lieut.-Colonel J. E., R.H.A. *Syward-lodge, Dorchester.*
1860	Michell, Thomas, Esq. *St. Petersburg.*
1863	*Michie, A., Esq. 26, *Austin-friars, E.C.*
1848	Middleton, Rear-Admiral Sir G.N. Broke, Bart., *H.M.S. 'Hero,' Sheerness; and Broke-hall, Suffolk.*
1859	Miland, John, Esq. *Clairville, Lansdown-road, Wimbledon.*
1866	Mildmay, Capt. Herbert St. John (Rifle Brigade). 19, *Charles-street, Berkeley-square, W.*
1866	Miles, John George, Esq. 4, *Stationers'-hall-court, Ludgate-hill, E.C.; and* 26, *Devonshire-place, Portland-place, W.*
1860	Miles, Rev. R. *Bingham, Notts.*
1861	1330Miller, George T., Esq. 59, *Portland-place, W.*
1861	*Miller, Commander Henry Matthew, R.N. *The Grove, Exeter; and Junior United Service Club, S.W.*
1853	*Miller, Capt. Thos., R.N. *H.M.S. 'Royal George;' and United Service Club, S.W.*
1861	Milligan, Joseph, Esq. 15, *Northumberland-street, W.C.*
1857	Mills, Arthur, Esq. 34, *Hyde-park-gardens, W.*
1863	*Mills, John R., Esq., M.P. *Kingswood-lodge, Tonbridge Wells.*
1864	Mills, Rev. John. 40, *Lonsdale-square, N.*
1863	*Milton, Viscount, M.P. 4, *Grosvenor-square, W.*
1860	Milman, Capt. Everard, Madras Horse Artillery. 9, *Berkeley-square, W.*
1866	Milne, Vice-Adml. Sir Alex., K.C.B. *United Service Club, S.W.*
1867	1340Milner, Rev. John, B.A. *Chaplain of H.M.S. 'Galatea.'*
1860	Mitchell, Capt. Alexander, M.P. 6, *Great Stanhope-street, Park-lane, W.*
1862	*Mitchell, George, Esq. 22, *Bolton-street, Piccadilly, W.*
1864	Mitchell, J. W., Esq. *Mansfield, Woodhouse, Notts.*
1864	Mitchell, Thomas, Esq., C.E. *Oldham.*
1859	Mitchell, Sir William. 6, *Hyde-park-gate, Kensington-gore, W.*
1865	Mitchell, Wm. H., Esq. *Junior Carlton Club, S.W.*
1851	*Mocatta, Frederick D., Esq. 35, *Gloucester-place, Portman-square. W.*
1853	Moffatt, George, Esq., M.P. 103, *Eaton-square, S.W.*
1861	Mollison, Alexander Fullerton, Esq. 10, *Lansdowne-terrace, Notting-hill, W.*
1861	1350Money, Lieut.-Col. George Henry. 9, *Berkeley-street, W.*
1842	*Montagu, Major Willoughby. *Clapham-common, S.*
1862	*Montague, Capt. Horace. 24, *Chapel-street, Park-lane, W.*
1830	*Montefiore, Sir Moses, Bart., F.R.S., F.R.S.N.A. 7, *Grosvenor-gate, Park-lane, W.; and East-cliff-lodge, Ramsgate.*
1859	Montgomerie, F. Butler, Esq. 2, *Cleveland-row, St. James's, S.W.; and St. Leonard's-on-Sea.*

Year of Election.

1859 Montgomerie, Capt. T. G., Engrs., 1st Assist. Trig. Survey. *Care of Messrs. Alexander Fletcher & Co.*, 10, *King's-arms-yard, Moorgate-street, E.C.*

1860 Montgomery, Robert Mortimer, Esq. 16, *Ulster-place, Regent's-park, N.W.*

1865 Montgomery, Sir Robert, K.C.B. 7, *Cornwall-gardens, Queen's-gate, W.*

1839 Moody, General R. C., R.E. *Caynham-house, near Ludlow, Shropshire.*

1861 Moon, Rev. Edward Graham. *Fetcham, Surrey.*

1857 1360*Moor, Rev. Allen P., M.A., F.R.A.S. *Sub-Warden St. Augustine College, Canterbury.*

1863 Moore, H. Byron, Esq. *Survey Office, Melbourne, Australia. Care of Mr. Wadeson*, 100, *St. Martin's-lane.*

1861 Moore, John Carrick, Esq. *Corswall, Wigtonshire; Geological Society, W.C.; and* 23, *Bolton-street, W.*

1857 Moore, Major-General W. Y. *United Service Club, S.W.*

1863 More, R. Jasper, Esq., M.P. *Linley-hall, Salop.*

1864 Morgan, D. L., Esq. *H.M.S. 'Euryalus.'*

1861 Morgan, Junius Spencer, Esq. 13, *Prince's-gate, Hyde-park, S.W.*

1861 Morgan, William, Esq., R.N. 1, *Sussex-place, Southsea, Hants.*

1866 Morland, Lieut. Henry, late I.N. *Assistant Dockmaster, &c., Bombay.*

1839 *Morris, Charles, Esq. *University Club, S.W.*

1866 1370*Morris, Herbert Henry, Esq., B.A. (late) Oxford; Bengal Civil Service. 6, *Clarence-parade, Southsea, Hants; and Middle-temple, E.C.*

1863 Morrison, Col. J. D. 7, *Albemarle-street, W.*

1867 Morrison, Pearson, Esq. 30, *Cornhill, E.C.*

1865 Morson, T., Esq. 124, *Southampton-row, Russell-square, W.C.*

1861 *Mouat, Frederick J., Esq., M.D., Surgeon-Major and Inspector-General of Prisons, Bengal Army, &c. *Athenæum Club, S.W.; and* 45, *Arundel-gardens, Notting-hill, W. Care of Messrs. A. C. Lepage & Co.*, 1, *Whitefriars-st., Fleet-st., E.C.*

1858 Mudie, Charles Edward, Esq.

1858 Mueller, Ferdinand, Esq., M.D., PH. DR. *Director of the Botanical Gardens, Melbourne. Care of Messrs. Dulau and Co.*, 37, *Soho-square, W.*

1862 Muir, Francis, Esq., LL.D.

1855 Muir, Thomas, Esq. 24, *York-terrace, Regent's-park, N.W.*

1867 *Muir, Thomas, Esq., Jun. *Madeira; and* 24, *York-terrace, Regent's-park, N.W.*

1866 1380Mundella, A. J., Esq. *Nottingham.*

1866 *Murchison, John H., Esq. *Surbiton-hill, Kingston-on-Thames; and Junior Carlton Club, S.W.*

1859 Murchison, Kenneth R., Esq. *Manor-house, Bathford, Bath.*

1830 *Murchison, Sir Roderick Impey, Bt., K.C.B., G.C.ST.A., M.A., D.C.L., V.P.R.S., G.S., and L.S., Director-General of the Geological Survey of Great Britain and Ireland, Trust. Brit. Mus., Hon. Mem. R.S. of Ed., R.I.A., Mem. Acad. St. Petersburg, Berlin, Stockholm, Brussels, and Copenhagen, Corr. Ins. Fr., *etc. etc.* 16, *Belgrave-square, S.W.; and* 28, *Jermyn-street, S.W.*

1864 Murchison, Capt. R. M. *Bath.*

1830 *Murdock, Thomas W. C., Esq. 8, *Park-street, Westminster, S.W.; and River-bank, Putney, S.W.*

Year of Election.	
1860	Murray, George J., Esq. *Hook-cottage, Horndean; and Jun. Carlton Club, S.W.*
1844	*Murray, James, Esq. *Foreign Office, S.W.*
1830	Murray, John, Esq. 50, *Albemarle-street, W.; and Newstead, Wimbledon, S.W.*
1860	*Murray, Lt. W., 68th Beng. N. Inf., Topo. Assist. G. Trig. Survey. *Mussoorie, India. Messrs. Smith, Elder and Co.*
1865	1390Mussy, H. G. de, Esq., M.D. 4, *Cavendish-place, W.*
1865	Nairne, P. A., Esq. 2, *Grove-hill, Camberwell, S.*
1853	Napier, Maj.-General Geo. Thomas Conolly, C.B. *Jun. United Service Club, S.W. Care of Sir J. Kirkland.*
1861	Napier, William, Esq. *St. Margaret's-house, Ipswich.*
1859	*Nasmyth, Capt. David J., 1st Assist. Trigonometrical Survey. *Bhooj, Bombay;* 5, *Charlotte-street, Edinburgh.*
1861	Neave, Sir Richard Digby, Bart. *Travellers' Club, S.W.;* 78, *Eccleston-square, S.W.; and Dagnam-park, Romford, Essex.*
1857	*Nesbitt, Henry, Esq. 6, *The Terrace, South Hackney, N.E.*
1867	Newdigate, Lieut.-Col. Francis W. (Coldstream Guards). *Care of Col. E. Newdigate, Assistant Adjutant-General, Aldershot Camp.*
1856	Newman, Thomas Holdsworth, Esq. 43, *Green-street, Grosvenor-square, W.*
1866	Nicol, James D., Esq., M.P. 13, *Hyde-park-terrace, Cumberland-gate, W.*
1865	1400*Nichols, Robert C., Esq. 5, *Westbourne-park-place, W.*
1856	Nicholson, Sir Charles, Bart., D.C.L., Chancellor of the University, Sydney. 26, *Devonshire-place, Portland-place, W.*
1836	Nicolson, Rear-Admiral Sir Frederick Wm. Erskine, Bart. 15, *William-street, Lowndes-square.*
1864	Nissen, H. A., Esq. *Mark-lane, E.C.*
1858	Nix, John H., Esq. 77, *Lombard-street, E.C.*
1861	Noel, the Hon. Roden. 11, *Chandos-street, Cavendish-square, W.; and Exton-hall, Oakham, Rutlandshire.*
1857	*Nolloth, Captain Matthew S., R.N. *Hong-Kong; United Service Club, S.W. and St. Mary's-cottage, Peckham, Surrey, S.E.*
1865	Norman, H. J., Esq. 106, *Fenchurch-street, E.C.*
1860	Norris, Harry, Esq. *Colonial Office, S.W.; and 4, Little St. James's-street, S.W.*
1861	North, Alfred, Esq. 20, *Royal York-crescent, Clifton, Bristol.*
1856	1410North, Frederic, Esq. 3, *Victoria-street, Pimlico, S.W.; and Hastings-lodge, Hastings.*
1865	Northumberland, Algernon George, Duke of. *Northumberland-house, S.W.*
1862	Notman, Henry Wilkes, Esq. 7, *Great Marlborough-street, W.*
1862	Nourse, Henry, Esq. *Conservative Club, S.W.*
1858	*Oakeley, R. Banner, Esq. *Oswaldkirk-hall, Yorkshire.*
1867	O'Brien, James, Esq. 109, *Belgrave-road, Pimlico, S.W.; and Clare, Ireland.*
1863	O'Callaghan, Chas., Esq., Staff Surgeon. *Killarney, Ireland.*

Year of Election.

1856 O'Connor, Major-General Luke Smyth, C.B., late Governor of the Gambia. *U.S. Club, S.W.*

1858 Ogilvie, Edward D., Esq. *Yulgillar, Clarence-river, New South Wales. Care of Messrs. Marryat and Sons, Laurence Pountney-lane, E.C.*

1863 Ogilvy, Col. Thos. 23, *Grafton-st., Piccadilly, W; and Ruthven, Forfarsh., N.B.*

1864 1420 Ogilvy, Thos., Esq. 62, *Princes-gate, Hyde-park, W.*

1859 Ogle, John W., Esq., M.D. 13, *Upper Brook-street, W.*

1861 Oldershaw, Capt. Robert Piggott. 74, *Warwick-square, Belgrave-road, S.W.*

1855 Oliphant, Laurence, Esq., M.P. *Athenæum Club, S.W.*

1861 Oliphant-Ferguson, G. H., Esq. *Broadfield-house, Carlisle.*

1866 Oliver, Lieut. S. P., 12th Brigade R.A. 1, *Buckingham-villas, Brockhurst-road, Gosport, Hants.*

1845 *Ommanney, Adml. Erasmus, C.B., F.R.A.S. 6, *Talbot-square, Hyde-park, W.; and United Service Club, S.W.*

1838 *Ommanney, H. M., Esq. *Blackheath, S.E.*

1864 O'Reily, E., Esq.

1853 Osborn, Sir George R., Bart. *Travellers' Club, S.W.; and Chicksand-priory, Beds.*

1864 1430 Osborn, Samuel, Esq., M.D. 19, *Manor-terrace, Brixton, S.*

1856 Osborn, Capt. Sherard, R.N., C.B., Officier de Légion d'Honneur, etc. *Athenæum Club, S.W.; and* 119, *Gloucester-terrace, W.*

1861 Osborne, Lieut.-Col. Willoughby. *Political Agent, Bhopal, Schira, India.*

1852 Oswell, William Cotton, Esq.

1855 Otway, Arthur John, Esq., M.P. *Army and Navy Club, S.W.*

1860 *Ouvry-North, the Rev. J. *East Acton, Middlesex, W.*

1844 *Overstone, Samuel, Lord, M.A., M.R.I. 2, *Carlton-gardens, S.W.; and Wickham-park, Surrey.*

1867 Owen, Chas. Lanyon, Esq. (Lieut, and Adj. R. M. Light Inf., Portsmouth Division). *Glendowan-lodge, Bury-road, Gosport.*

1865 Owen, H. Burnard, Esq.

1846 *Oxford, Rt. Rev. Samuel Wilberforce, Bishop of, F.R.S., F.S.A. 26, *Pall-mall, S.W.; Cuddesden-palace, Wheatley, Oxfordshire; and Lavington, Sussex.*

1861 1440 Page, Thomas, Esq., C.E., F.G.S. 3, *Adelphi-terrace, W.C.; and Tower Cressy, Aubrey-road, Bayswater, W.*

1853 Pakington, Right Hon. Sir John Somerset, Bart., M.P. 41, *Eaton-square, S.W.; and Westwood-park, Droitwich, Worcestershire.*

1855 Palmer, Major Edm., R.A. *Boxhill, Pennycross, Plymouth.*

1865 *Palmer, Commander George, R.N. *H.M.S. 'Rosario,' Australia; and Cavers, Hawick, Roxburgshire, N.B.*

1862 Palmer, Rev. Jordan, M.A., F.S.A., Chaplain to St. Ann's Royal Society. *Streatham, S.*

1838 *Palmer, Samuel, Esq.

1865 *Papengouth, Oswald C., Esq., C.E. 46, *Russell-square, W.C.*

1863 *Paris, H.R.H. Le Comte de. *Claremont.*

1864 Parish, Capt. A. *Chislehurst, Kent.*

Year of Election.	
1849	*Parish, Capt. John E., R.N. *Army and Navy Club, S.W. Care of Messrs. Stilwell.*
1833	1450*Parish, Sir Woodbine, K.C.H., F.R.S., &c. *Quarry-house, St. Leonard's-on-Sea.*
1866	Parker, Capt. Francis G. S. *Salford Barracks, Manchester.*
1862	Parker, Henry T., Esq. 3, *Ladbroke-gardens, Kensington-park, W.*
1862	Parker, Robert Deane, Esq. *Union Club, S.W.; and Barham, Canterbury.*
1850	Parkes, Sir Harry S., C.B., &c. *Oriental Club, W.; and Athenæum Club, S.W.*
1850	*Parkyns, Mansfield, Esq., F.Z.S. *Arthur's Club, St. James's-street, S.W.; and Woodborough-hall, Southwell.*
1859	Pasteur, Marc Henry, Esq. 38, *Mincing-lane, E.C.*
1867	Paterson, John, Esq. 19A *Coleman-street, City, E.C.*
1857	Paton, Andrew A., Esq. *H.B.M.'s V.-Consul, Missolonghi, Greece.*
1863	Pattinson, J., Esq. 21, *Bread-street, E.C.*
1858	1460Paul, Joseph, Esq. *Ormonde-house, Ryde, Isle of Wight.*
1865	Payne, Captain J. Bertrand, M.R.I., F.R.S.L., Mem. Geograph. Soc. of France. *Conservative Club, S.W.; Royal Thames Yacht Club, W.; and Tempsford-house, The Grange, Brompton, W.*
1847	*Paynter, William, Esq., F.R.A.S. 21, *Belgrave-square, S.W.; and Camborne-house, Richmond, Surrey, S.W.*
1855	Peabody, George, Esq. 22, *Old Broad-street, E.C.*
1853	Peacock, George, Esq. *Starcross, near Exeter.*
1863	Pearse, Capt. R. B., R.N. *Arthur's Club, St. James's-street, S.W.*
1863	Pearson, Fred., Esq. 13, *Cleveland-square, W.*
1853	*Peckover, Alexander, Esq. *Wisbeach.*
1860	*Peek, Henry William, Esq. *Wimbledon-house, S.W.*
1861	Peel, Archibald, Esq. 56, *Portland-place.*
1858	1470Peel, Sir Robert, Bart., M.P. 4, *Whitehall-gardens, S.W.; and Drayton-manor, Tamworth.*
1859	*Pennant, George Sholto Douglas, Esq. *Penrhyn-castle, Bangor.*
1863	*Pennant, Col. S. S. Douglas. *Penrhyn-castle, Bangor, N.B.*
1853	Percy, Major-General the Hon. Lord Henry M. (Guards). *Northumberland-house.*
1865	Pereira, Francisco E., Esq. *Care of Messrs. Richardson*, 13, *Pall-mall.*
1865	Perkes, Samuel, Esq., late Hon. E.I.C.S., Bombay, F.G.S., F.Z.S., M.S.A., &c. 72, *Cornhill, E.C.; and Belvedere-house, West Dulwich, S.*
1860	Perkins, Frederick, Esq. *Mayor of Southampton.*
1865	Perkins, William, Esq. *Rosario, Argentine Republic. Care of W. Bollaert, Esq.*
1859	Perry, Sir Erskine, Member Indian Council. 36, *Eaton-place, S.W.*
1859	Perry, William, Esq., H.B.M.'s Consul, Panama. *Athenæum Club, S.W.*
1862	1480*Perry, William, Esq. 9, *Warwick-road, Upper Clapton, N.E.*
1862	Peter, John, Esq.
1857	*Peters, William, Esq. 35, *Nicholas-lane, Lombard-street, E.C.*
1860	Petherick, John, Esq. *Henley-on-Thames.*
1858	Peto, Sir S. Morton, Bart., M.P. 12, *Kensington-palace-gardens, W.*
1861	Petrie, Alexander S., Esq. 4, *St. Mark's-square, N.W.*
1860	Petrie, Captain Martin, 14th Regiment. *Hanover-lodge, Kensington-park, W.*

Year of Election	
1866	Pharazyn, Robert, Esq. *Wellington, New Zealand.*
1867	Phayre, Col. Sir Arthur. *East India United Service Club, S.W.*
1854	Phelps, William, Esq. 18, *Montagu-place, Russell-square, W.C.*
1862	1490Phené, John Samuel, Esq. 34, *Oakley-street, Chelsea, S.W.*
1860	Philip, George, Esq. 32, *Fleet-street, E.C.*
1865	Philipps, Edward B., Esq. 105, *Onslow-square, S.W.*
1857	Phillimore, Capt. Augustus, R.N. 25, *Upper Berkeley-st., W.; and U.S. Club, S.W.*
1859	Phillimore, Chas. Bagot, Esq. *India Office, S.W.; and* 25, *Upper Berkeley-st., W.*
1863	Phillimore, Sir Robert. 5, *Arlington-street, S.W.*
1860	Phillimore, Wm. Brough, Esq., late Capt. Grenadier Guards. 5, *John-street, Berkeley-square, W.*
1830	*Phillipps, Sir Thomas, Bart., M.A., F.R.S., F.S.A. *Middle-hill, Broadway, Worcestershire.*
1854	Phillips, Major-General Sir B. Travell. *United Service Club, S.W.*
1856	Phillips, John, Esq., Solicitor. *Hastings.*
1864	1500*Pigou, F. A. P., Esq. *Dartford, Kent.*
1865	Pigou, Rev. F., M.A. 14, *Suffolk-street, Pall-mall East, S.W.*
1861	Pike, Frederick, Esq. 44, *Charing-cross, S.W.*
1852	*Pike, Commander John W., R.N. 26, *Old Burlington-street, W.; Junior United Service Club, S.W.*
1855	Pilkington, James, Esq. *Reform Club, S.W.; and Blackburn.*
1851	*Pim, Commander Bedford C. T., R.N. *Belsize-square, Hampstead, N.W.; and Senior and Junior United Service Club, S.W.*
1858	Pincott, James, Esq. *Telham-house-school, Brixton-hill, S.*
1859	Pinney, Colonel William. 30, *Berkeley-square, W.*
1867	Plant, Nathaniel, Esq. *Hotel Exchange, Rio de Janeiro; and De Montfort-house, Leicester.*
1865	Player, John, Esq. 36, *George-street, Edgbaston, Birmingham.*
1860	1510Playfair, Lieut.-Col. Robert Lambert. H.B.M. Consul-General, Algiers. *Care of E. Hertslet, Esq., Foreign-office.*
1866	Plowden, Charles, C., Esq. 15, *York-street, Portman-square, W.*
1856	*Plowes, John Henry, Esq. 39, *York-terrace, Regent's-park, N.W.*
1855	*Pollexfen, Capt. J. J. *India.*
1866	*Pollington, Jno. Horace, Viscount. 33, *Dover-street, W.*
1853	Pollock, General Sir George, G.C.B. *Clapham-common, Surrey, S.*
1835	*Ponsonby, Hon. Frederick G. B. 3, *Mount-street, Grosvenor-square, W.*
186 0	Pook, Captain John. 6, *Colfe's-villas, Lewisham-hill, S.E.*
1857	Pope, Captain Wm. Agnew. 52, *Charles-street, Berkeley-square, W.*
1863	*Porcher, Commander Edwin A., R.N. 50, *Montagu-square, W.*
1853	1520Porter, Edwd., Esq. *Athenæum Club, S.W.; and* 26, *Suffolk-street, Pall-mall, S.W.*
1864	Portugal, Chev. Joaquim de. 11, *South-terrace, Grosvenor-park, Camberwell, S.*
1867	Potter, Wm. Henry, Esq. *Dunsden-lodge, Sowning, near Reading.*

Year of Election.	
1861	*Pounden, Captain Lonsdale. *Junior United Service Club, S.W.; and Brownswood, Co. Wexford.*
1862	Povah, Rev. John V., M.A. 11, *Endsleigh-street, W.C.*
1864	*Powell, F. S., Esq., M.P. 1, *Cambridge-square, Hyde-park, W.*
1859	Power, E. Rawdon, Esq. 5, *Quadrant, St. Leonard's, Exeter, Devon.*
1854	Power, John, Esq. 3, *College-terrace, Cambridge-road, Hammersmith, W*
1854	Power, John Arthur, Esq., M.A., B.M. 52, *Burton-crescent, W.C.*
1864	Powys, Hon. C. J. F.
1864	1530Powys, the Hon. E. R.
1864	Powys, Hon. Leopold. 17, *Montagu-street, Portman-square, W.*
1852	Price, James Glenie, Esq., Barrister-at-Law. 14, *Clement's-inn, W.C.*
1860	*Prickett, Rev. Thomas William, M.A., F.S.A. 15, *Cornwall-gardens, Queen's-gate, W.*
1865	*Pringle, A. Esq. *Yair, Selkirk, N.B.*
1855	*Pringle, Thomas Young, Esq. *Reform Club, S.W.*
1866	*Prinsep, Edw. Aug., Esq., B.C.S., Commissioner of Settlements in the Punjab. *Umritsur. Care of Messrs. Smith, Elder, and Co., 65, Cornhill, E.C.*
1845	Prinsep, Henry T., Esq. *Little Holland-house, Kensington, W.*
1861	*Prodgers, Rev. Edwin. *The Rectory, Ayott St. Peter's, Herts.*
1852	Prout, John William, Esq., M.A., Barrister-at-Law. *Athenæum Club, S.W. and Neasdon, Middlesex, N.W.*
1862	1540*Puget, Major J. 8*th Hussars, Aldershot.*
1860	Puller, Arthur Giles, Esq. *Athenæum Club, S.W.; Arthur's Club, S.W.; and Youngsbury, Ware.*
1857	Purcell, Edward, Esq., LL.D. 2, *Maze-hill, Greenwich, S.E.*
1867	Quin, Francis Beaufort Wyndham, Esq. *Wistanswick-house, near Market Drayton, Salop.*
1861	Quin, Lord George. 15, *Belgrave-square, S.W.*
1862	Quin, John Thos., Esq. *Care of Mr. Lambson, Epsom.*
1854	*Quin, Admiral Michael. *Senior United Service Club, S.W.; and* 18, *Albion-villas, Albion-road, Islington, N.*
1858	*Radstock, Graville Augustus, Lord. 30, *Bryanston-square, W.*
1862	*Rae, James, Esq. 32, *Phillimore-gardens, Kensington, W.*
1853	Rae, John, Esq., M.D. *Birstane-house, Kirkwall, Orkney; and* 4, *Fenchurch-street, E.C.*
1867	1550Raleigh, Rev. A., D.D. *Arran-house, Highbury-new-park.*
1866	Ramsay, Alex., Jun., Esq. 45, *Norland-square, Notting-hill, W.*
1867	Ramsay, John, Esq. *Islay, N.B.*
1851	*Ramsay, Rear-Admiral Wm., C.B., F.R.A.S. *Junior United Service Club, S.W.; and* 23, *Ainslie-place, Edinburgh.*
1867	*Ramsden, Richard, Esq., B.A. *Camp-hill, Nuneaton, Warwickshire.*

Year of Election.	
1866	Ransom, Edwin, Esq. *Kempstone, near Bedford.*
1864	Ranyard, A. C., Esq. 13, *Hunter-street, W.C.*
1862	Rasch, F., Esq. 30, *Cambridge-square, Hyde-park, W.*
1859	Ratcliff, Charles, Esq., F.S.A. *National Club, S.W.; Edgbaston, Birmingham; and Downing College, Cambridge.*
1861	Rate, Lachlan Macintosh, Esq. 9, *South Audley-street, W.*
1846	1560 Ravenshaw, E. C., Esq., M.R.A.S. *Oriental Club, W.; and* 36, *Eaton-sq., W.*
1859	Ravenstein, Ernest G., Esq. *Topographical Depôt, Spring-gardens, S.W.*
1865	Rawlings, Thos., Esq. *Hampton-villa, Pembridge-place, Bayswater, W.*
1861	Rawlinson, Sir Christopher. *United University Club, S.W.*
1844	*Rawlinson, Maj.-General Sir Henry C., M.P., K.C.B., D.C.L., F.R.S. *Athenæum Club, S.W.; and* 1, *Hill-street, Berkeley-square, W.*
1838	Rawson, His Excellency Rawson Wm., C.B., Colonial Secretary. *Bahamas.*
1866	Ray, W. H., Esq. *Thorn-house, Ealing.*
1863	Reade, W. Winwoode, Esq. *Conservative Club.*
1865	Redhead, R. Milne, Esq. *Springfield, Seedley, Manchester; Conservative Club, S.W.; and Junior Carlton Club, S.W.*
1861	*Reid, David, Esq. 95, *Piccadilly, W.*
1858	1570 Rees, L. E. R., Esq. 43, *Lime-street, E.C.*
1859	Reeve, John, Esq. *Conservative Club, S.W.*
1866	*Rehden, George, Esq. 9, *Great Tower-street, E.C.*
1856	Reid, Henry Stewart, Esq. *Bengal Civil Service. Messrs. Smith, Elder and Co.*
1857	Reid, Lestock R., Esq. *Athenæum Club, S.W.; and* 122, *Westbourne-ter., W.*
1861	Reid, William, Esq., C.E. 27, *Chalcot-villas, Haverstock-hill, N.W.*
1861	Reilly, Anthony Adams, Esq. *Belmont, Mullingar.*
1830	*Rennie, Sir John, C.E., F.R.S., F.S.A. *Care of — Rennie, Esq., Mitre-court-chambers, Temple, W.C.*
1866	*Rennie, John Keith, Esq., M.A. Camb. 56, *Gloucester-terrace, Hyde-park, W.*
1834	*Rennie, M. B., Esq., C.E. 22, *Portman-street, Portman-square, W.*
1864	1580 Rennie, W., Esq. 14, *Hyde-park-square. W.*
1830	*Renwick, Lieutenant, R.E.
1861	Reuter, Julius, Esq. 1, *Royal Exchange-buildings, E.C.*
1858	Reynardson, Henry Birch, Esq. *Adwell, near Tetsworth, Oxfordshire.*
1867	Rhodes, Arthur John, Esq. 1, *Monmouth-road, Westbourne-grove, Bayswater, W.*
1857	Richards, Capt. George H., R.N. *Hydrographer to the Admiralty, S.W.*
1860	Richards, the Rev. George, D.D.
1864	Richardson, F., Esq. *Park-lodge, Blackheath-park.*
1859	Rickards, Edward Henry, Esq. 4, *Connaught-place, Hyde-park, W.*
1862	Riddell, Henry P. A. Buchanan, Esq. *The Palace, Maidstone, Kent.*
1865	1590 *Rideout, W. J., Esq. 12, *Wellington-street, Strand, W.C.*
1864	Ridley, F. H., Esq. 19, *Blomfield-road, Maida-hill, W.*
1864	Ridley, George, Esq. 2, *Charles-street, Berkeley-square, W.*

Year of Election.	
1862	*Rigby, Major-General Christopher Palmer, C.B., H.M.B. Consul, *Zanzibar; and Oriental Club, W.*
1862	Rigby, Joseph D., Esq. *Esher, Surrey; and Kew-green, Surrey, W.*
1860	Rintoul, Robert, Esq. *Windham Club, S.W.*
1863	Ritchie, John, Esq. 22, *Blessington-road, Lee, Kent.*
1830	*Robe, Maj.-General Fred. Holt, C.B. *U. S. Club, S.W.; and* 5, *Palace-gardens-terrace, Kensington, W.*
1862	Roberts, Arthur, Esq. *Ormond-house,* A, *Old Kent-road, S.E.*
1861	Roberts, Capt. E. Wynne. *Junior Carlton Club, S.W.; and* 18, *Great Cumberland-street, Hyde-park, W.*
1864	1600Roberts, R. W., Esq., B.A. *Treval, Torpoint, Cornwall.*
1865	Robertson, A. Stuart, Esq., M.D. *Horwich, near Bolton.*
1860	Robertson, D. Brooke, Esq., H.B.M.'s Consul. *Canton. Smith, Elder and Co.*
1861	*Robertson, Graham Moore, Esq. 21, *Cleveland-square, Hyde-park, W.*
1863	Robertson, R. B., Esq. *H.M.'s Legation, Yokahama, Japan.*
1866	Robins, Thomas Valentine, Esq. *Sidney-cottage, Halebank, Ditton, Liverpool.*
1853	Robinson, Albert, Esq., C.E. *Roehampton.*
1830	*Robinson, Rear-Admiral Charles G. 12, *Warwick-road, Maida-hill, W.*
1859	Robinson, Lieut.-Col. D. G., R.E., Director-Gen. of Telegraphs in India. *Calcutta.*
1863	Robinson, Geo. M., Esq. 5, *Paragon, Southwark, S.*
1864	1610Robinson, H. O., Esq. 12, *Leadenhall-street, E.C.*
1859	Robinson, Sir Hercules G. R. *Governor of Ceylon. Messrs. Burnett,* 17, *Surrey-street.*
1865	Robinson, J. R., Esq., F.S.A. Scot., F.R.S.A. du Nord, Copenhagen, F.G.S. Edin., Membre Société Asiatique de Paris, &c. *South-terrace, Dewsbury.*
1860	Robinson, Mr. Serjeant. 8, *King's-bench-walk, Temple, E.C.; and* 43, *Mecklenburg-square, W.C.*
1862	Robinson, Lieut.-Col. Sir John Stephen, Bart. *Rokeby-hall, Dunleer, Ireland; Arthur's Club, S.W.; and* 16A, *Park-lane, W.*
1864	Robinson, John, Esq. *Care of Geo. Street, Esq.,* 30, *Cornhill, E.C.*
1855	Robinson, Thos. Fleming, Esq., F.L.S. 9, *Derwent-road, South Penge-park, Anerley.*
1850	*Robinson, Walter F., Esq., Commander R.N. 13, *Edwards-street, Portman-square, W.*
1830	*Rodd, James Rennell, Esq.
1860	Roe, Capt. Jno. Septimus, Surveyor-General, W. Australia. *Messrs. Stilwell, Arundel-street, Strand, W.C.*
1863	1620Rogers, John T., Esq. 38, *Eccleston-square, S.W.*
1830	*Roget, Peter M., Esq., M.D., F.R.S. 18, *Upper Bedford-place, Russell-sq., W.C.*
1861	Rollo, Lord. 18, *Upper Hyde-park-gardens, W.; and Dumcrieff-castle, Moffat, N.B.*
1863	Rönn, M. Herman von. 21, *Kensington-park-gardens, W.*
1866	Rooke, Capt. W., R.A. *Formosa, Lymington, Hants.*
1834	*Rose, the Right Hon. Sir George, F.R.S., LL.D. 4, *Hyde-park-gardens, W.; and* 25, *Southampton-buildings, Chancery-lane, W.C.*

Year of Election

1861 Rose, Jas. Anderson, Esq. *Wandsworth, Surrey, S.W.; and* 11, *Salisbury-street, W.C.*

1857 *Rose, Wm. A., Esq., Alderman. 63, *Upper Thames-street, E.C.; and Befions, Crawford.*

1864 Ross, B. R., Esq. *Care of the Hudson-bay Company, Hudson-bay-house, Fenchurch-street, E.C.*

1863 Ross, Wm. Andrew, Esq. 7, *Albemarle-street, W.*

1867 1630Rossiter, Wm., Esq. *South London Working Men's College, Collingwood-street, S.*

1864 *Roundell, C. S., Esq. 44, *Piccadilly, W.*

1862 Roupell, Robert Priolo, Esq., M.A., Q.C. A5, *Albany, W.*

1839 *Rous, Vice-Admiral the Hon. Henry John. 13, *Berkeley-square, W.*

1864 Routh, E. J., Esq. *St. Peter's College, Cambridge.*

1862 Rowe, Sir Joshua, C.B., late Chief Justice of Jamaica. 10, *Queen Anne-street, Cavendish-square, W.*

1863 Rowley, Commr. C., R.N. 48, *Onslow-square, Brompton, S.W.*

1856 Rucker, J. Anthony, Esq. *Blackheath, S.E.*

1861 *Rumbold, Charles James Augustus, Esq. *Downing College, Cambridge; and* 5, *Percival-terrace, Brighton.*

1861 Rumbold, Thomas Henry, Esq.

1860 1640Rumley, Major-General Randall, Vice-President Council of Military Education. 12, *Cadogan-place, S.W.*

1858 *Russell, Arthur John Edward, Esq., M.P. 2, *Audley-square, W.*

1830 *Russell, Jesse Watts, Esq., D.C.L., F.R.S.

1830 Russell, John, Earl, F.R.S. 37, *Chesham-place, S.W.; Pembroke-lodge, Richmond, S.W.; Endsleigh-ho., Devon; and Gart-ho., near Callandar, N.B.*

1860 Russell, Wm. Howard, Esq., LL.D.

1860 Rutherford, John, Esq. 2, *Cavendish-place, Cavendish-square, W.*

1857 *Ryder, Admiral, Alfred P. *U.S. Club, S.W.; and Launde-abbey, Uppingham.*

1864 Ryder, G., Esq. 10, *King's Bench-walk, Temple, E.C.*

1852 Sabine, Major-General Edw., R.A., Pres. R.S., F.R.A.S., &c. &c. 13, *Ashley-place, Victoria-street, Westminster, S.W.; and Woolwich, S.E.*

1847 St. Asaph, Rt. Rev. Thos. Vowler Short, Bishop of. *Palace, St. Asaph, N. Wales.*

1857 1650St. David's, Connop Thirlwall, Bishop of. *Abergwlly-palace, Carmarthen.*

1863 St. George, Maj.-Gen. J. 17, *Rutland-gate, S.W.*

1863 St. John R. H. St. Andrew, Esq., 60th Rifles.

1862 St. John, Spenser, Esq., Chargé d'Affaires, Port-au-Prince, Haiti. 25, *Grove-end-road, St. John's-wood, N.W.*

1863 Sale, Lieut. M. T., R.E. *The Crescent, Rugby; and Cherrapoonjee, Bengal.*

1867 Salkeld, Colonel J. C. (H.M.I. Forces). 29, *St. James's-street, S.W.*

1845 *Salomons, David, Esq., M.P., Alderman, F.R.A.S. 26, *Great Cumberland-place, Hyde-park, W.; and Broom-hill, near Tunbridge-wells.*

1863 *Salt, Henry, Esq. 29, *Gordon-square, W.C.*

1861 Salting, William Severin, Esq. 24, *St. James's-street, S.W.*

Year of Election.	
1861	*Sandbach, Wm. Robertson, Esq. 10, *Prince's-gate, Hyde-park, S.W.*
1867	1660Sandeman, David George, Esq., *Cambridge-house, Piccadilly, W.; and 2 Albion-street, Hyde-park, W.*
1862	Sanford, Major Henry Ayshford. 29, *Chester-street, Grosvenor-place, W.; and Nynehead-court, Wellington, Somerset.*
1863	Santos, Le Chev. G. dos. 12, *Gloucester-place, Portman-square, W.*
1860	Sarel, Lieut.-Colonel H. A., 17th Lancers. *Army and Navy Club, S.W.; and Shanghae.*
1862	Sargood, F. J., Esq. *Moorgate-street-buildings, E.C.*
1860	Sartoris, Alfred, Esq.
1852	Saumarez, Captain Thomas, R.N. *The Firs, Jersey.*
1866	Saunders, James E., Esq. 9, *Finsbury-circus; and Granville-pk., Blackheath, S.E.*
1864	Saurin, Admiral E. *Prince's-gate, S.W.*
1863	Sawyer, Col. Charles, 6th Dragoon Guards. 50, *Sussex-square, Kemp-town, Brighton.*
1863	1670Sayer, Captain Frederick. *Gibraltar; and Manor-house, Richmond, S.*
1838	Scarlett, Lieut.-General the Hon. Sir J. Yorke, K.C.B. *Portsmouth.*
1861	Schenley, Edward W. H., Esq. 14, *Prince's-gate, S.W.*
1866	Scott, Adam, Esq. 3, *Blomfield-crescent, Westbourne-terrace, W.*
1859	Scott, Lord Henry, M.P. 3, *Tilney-street, Park-lane, W.*
1861	*Scott, Hercules, Esq. *Brotherton, near Montrose, N.B.*
1855	Scott, Admiral Sir James, K.C.B. *United Service Club, S.W.*
1866	Scott, John, Esq., M.D.
1863	Scovell, George, Esq. 34, *Grosvenor-place, S.W.*
1861	Searight, James, Esq. 80, *Lancaster-gate, W.*
1867	1680Seaton, Col. the Right Hon. Lord. D 3, *Albany, W.*
1830	*Sedgwick, the Rev. A., Woodwardian Lecturer, M.A., F.R.S. *Athenæum Club, S.W.; and Cambridge.*
1862	Seemann, Berthold, Esq., PH. DR., F.L.S. 57, *Windsor-road, Holloway, N.*
1866	Sendall, Walter T., Esq., Inspector of Schools in Ceylon. *Colombo, Civil Service Club, S.W.*
1865	Sercombe, Edwin, Esq. 49, *Brook-street, Grosvenor-square, W.*
1858	*Serocold, Charles P., Esq. *Brewery, Liquorpond-street, E.C.*
1853	Sevin, Charles, Esq. 155, *Fenchurch-street, E.C.*
1853	Sewell, Henry, Esq. 15, *Copthall-court, Throgmorton-street, E.C.; and Stamford-hill, N.*
1867	Seymour, Alfred, Esq., M.P. 47, *Eaton-square, S.W.*
1858	Seymour, George, Esq. 12, *Sussex-square, Hyde-park, W.*
1855	1690Seymour, Admiral Sir Geo. F., K.C.B., G.C.H. 115, *Eaton-square, S.W.*
1853	*Seymour, Henry Danby, Esq., M.P. 39, *Upper Grosvenor-street, W.; Knoley-Hindon, Wilts; and Glastonbury, Somersetshire.*
1854	*Shadwell, Captain Charles F. A., R.N., C.B. *Royal Naval Hospital, Haslar, Gosport.*
1860	*Shadwell, Lieut.-Colonel Lawrence.

Year of Election.	
1856	*Share, James Masters, Esq., R.N. *H.M.S. 'St. George,' Portland, Dorsetshire.*
1866	Sharp, Henry T., Esq. 102, *Piccadilly, W.*
1861	Sharp, Peter, Esq. *Oakfield, Ealing, W.*
1861	*Sharpe, William John, Esq. 1, *Victoria-street, Westminster, S.W.; and Norwood, Surrey, S.*
1862	*Shaw, John, Esq. *Finegand, Otago, New Zealand.*
1861	Shaw, John Ralph, Esq. *Arrowe-park, Birkenhead.*
1858	1700Shea, John, Esq., M.D., Surgeon R.N. 84, *Blackfriars-road, S.*
1846	Sheffield, George A. F. C., Earl of. 20, *Portland-pl., W.; and Sheffield-pk., Sussex.*
1857	Sheil, Major-Gen. Sir Justin, K.C.B. 13, *Eaton-place, Belgrave-square, S.W.*
1861	Shephard, Chas. Douglas, Esq., Surg. R.N. *H.M.S. 'Frederick William,' Foynes, County Limerick.*
1867	Shepherd, Chas. Wm., Esq., M.A., F.Z.S. *Trotterscliffe, Maidstone.*
1861	Shepherd, Rev. Edwd. John, M.A. *Trotterscliffe, Kent; and Athenæum Club, S.W.*
1867	Sherer, General Sir George Moyle. 31, *Inverness-road, Hyde-Park, W.*
1860	Sheridan, H. Brinsley, Esq., M.P. *Bellefield-house, Parson's-green, Fulham, S.W.*
1863	Sheridan, Richd. B., Esq., M.P. 48, *Grosvenor-place, S.W.*
1857	Sherrin, Joseph Samuel, Esq., LL.D., PH. DR. *Leyton-house, Leyton-crescent, Kentish-town, N.W.*
1859	1710*Sherwill, Lt.-Col. W.S., F.G.S. *Prof. of Surveying, Civil Engr. College, Calcutta; and Perth, N.B.*
1858	*Shipley, Conway M., Esq. *Twyford Moors, Winchester; and Army and Navy Club, S.W.*
1866	Sholl, Charles, Esq., C.E.
1862	Showers, Lieut.-Col. Charles S.
1856	Shuttleworth, Sir J. P. Kay, Bart. 38, *Gloucester-square, W.; and Gawthorp-hall, Burnley, Lancashire.*
1865	*Silva, Frederic, Esq. 12, *Cleveland-square, Bayswater, W.*
1859	Silver, the Rev. Fred., M.A., F.R.A.S. *Norton-rectory, Market Drayton, Salop.*
1859	*Silver, Stephen Wm., Esq. 66, *Cornhill, E.C.; and Norwood-lodge, Lower Norwood, S.*
1860	Sim, John Coysgame, Esq. 13, *James-street, Buckingham-gate, S.W.*
1853	Simmons, Edward R., Esq., Barrister-at-Law. 4, *Hyde-park-gate, S.W.*
1848	1720*Simmons, Colonel John L. A., R.E., C.B. *H. B. M.'s Consul, Warsaw; United Service Club, S.W.*
1866	Simons, Henry M., Esq. *Tyersall-crescent, Wood-road, Sydenham-hill, S.E.*
1853	Simpkinson, Lieut. Francis G., R.N. 55, *Victoria-street, Westminster, S.W.*
1864	Simpson, Frank, Esq. 17, *Whitehall-place.*
1862	Simpson, Henry Bridgeman, Esq. 44, *Upper Grosvenor-street, W*
1861	Simpson, James, Esq., C.E., F.G.S. 29, *Great George-street, Westminster, S.W.*
1863	*Simpson, Wm., Esq. 64, *Lincoln's-inn-fields, W.C.*
1866	*Sims, Richard Proctor, Esq., C.E. *Malabar-hill, Bombay. Care of Messrs. Smith, Elder, and Co.*
1858	Skelmersdale, Edward, Lord. *Lattom-park, Ormskirk, Lancashire.*

Year of Election.	
1866	Skinner, John E. H., Esq. 3, *Dr. Johnson's-buildings, Temple, E.C.*
1866	1730Skribaneck, Baron A., Lieutenant of the Austrian Navy. *Marine Academy, Fiume, Austria. Care of F. Engelhardt, Esq.*, 9, *Billiter-square, E.C.*
1863	Skrine, Hy. D., Esq. *Warleigh-manor, near Bath.*
1861	Sladen, Rev. Edward Henry Mainwaring. *Alton, near Marlborough, Wilts.*
1861	Sligo, G. J. Browne, Marquis of. 14, *Mansfield-street, W.; and Westport, County Mayo.*
1865	Smedley, Joseph V., Esq., M.A. *Oxford and Cambridge Club, S.W.*
1860	*Smith, Augustus Henry, Esq. *Flexford-house, Guildford.*
1857	*Smith-Bosanquet, Horace, Esq. *Broxbourne-borough, Hoddesdon.*
1866	Smith, Drummond, Esq. 7, *Mount-street, Berkeley-square, W.*
1859	Smith, Edward, Esq. *Windham Club, S.W.*
1867	Smith, Frederick, Esq. *The Priory, Dudley.*
1853	1740Smith, George, Esq. *Glinton, near Market Deeping, Lincolnshire.*
1857	Smith, George R., Esq. 73, *Eaton-square, S.W.; and Telsden-park, Surrey.*
1865	Smith, Guildford, Esq. 63, *Charing-cross, S.W.*
1861	Smith, Jervoise, Esq. 47, *Belgrave-square, S.W.*
1854	Smith, John, Esq., Memb. Geograph. Soc. Bombay. 27, *Prince's-gate, S.W.*
1853	Smith, John Harrison, Esq. 49, *Inverness-terrace, W.*
1853	Smith, John Henry, Esq. 1, *Lombard-st., E.C.; and Purley, Croydon, Surrey.*
1861	Smith, J. Sidney, Esq., Barrister-at-Law. *Sidney-lodge, Wimbledon-common, S.W.*
1861	*Smith, Joseph Travers, Esq. 25, *Throgmorton-street, E.C.*
1838	*Smith, Octavius Henry, Esq. *Thames-bank, Westminster, S.W.*
1857	1750Smith, Captain Philip, Grenadier Guards.
1841	*Smith, Thomas, Esq.
1859	*Smith, W. Castle, Esq. 1, *Gloucester-terrace, Regent's-park, N.W.*
1857	Smith, Wm. Gregory, Esq. *Hudson-bay Company, Fenchurch-street, E.C.*
1859	Smith, William Henry, Esq. 1, *Hyde-park-street, W.*
1837	*Smyth, Rear-Adm. William. *Care of Messrs. Child and Co., Temple-bar.*
1850	*Smythe, Colonel William J., R.A.
1863	Snowden, Francis, Esq., M.A. 1, *Dr. Johnson's-buildings, Temple, E.C.*
1865	Solomons, Hon. Geo. *Craven Hotel, W.C.; and Jamaica.*
1839	*Somers, Charles, Earl. 33, *Prince's-gate, S.W.; Eastnor-castle, Herefordshire; and The Priory, Reigate, Surrey.*
1862	1760Somerset, Capt. Leveson E. H., R.N. *Care of Messrs. Chard*, 3, *Clifford's-inn, Fleet-street, E.C.*
1858	*Somes, Joseph, Esq. *Fortismere, Muswell-hill, N.*
1855	Sopwith, Thos., Esq., M.A., C.E., F.R.S. 103, *Victoria-street, Westminster, S.W.*
1845	*Sotheby, Lt.-Col. Fred. S., C.B., F.R.A.S. 100, *Park-lane, W.*
1861	South, John Flint, Esq. *Blackheath-park, S.E.*
1860	Southesk, James Carnegie, Earl of. *Kinnaird-castle, Brechin, N.B.*
1860	*Southey, Jas. Lowther, Esq. *Care of Messrs. Stilwell.*
1865	Spalding, Samuel, Esq. 7, *Upper Park-road, South Hampstead.*
1850	*Spencer-Bell, James, Esq. 1, *Devonshire-place, Portland-place, W.*

Year of Election.

1867 Spicer, Edward, Esq. *Highbury-crescent, N.*

1863 1770Spickernell, Dr. Geo. E., Principal of Eastman's Royal Naval Establishment. *Eastern-parade, Southsea.*

1861 Spofforth, Markham, Esq. 3, *Porchester-terrace, W.*

1855 *Spottiswoode, William, Esq., F.R.S. 50, *Grosvenor-place, S.W.*

1859 *Spratt, Capt. Thos. A. B., R.N., C.B. *Mount Ephraim, Tunbridge-wells, Kent.*

1866 Spruce, Richard, Esq., PH. DR. *Hurstpierpoint, Sussex.*

1859 Stafford, Edward W., Esq. *Colonial Secretary of New Zealand; care of Mr. J. S. Tytler,* 19, *Castle-street, Edinburgh.*

1853 Stanford, Edward, Esq. 6, *Charing-cross, S.W.*

1855 Stanhope, Philip Henry, Earl, Pres. Soc. of Antiquaries. 3, *Grosvenor-place-houses, Grosvenor-place, S.W.; and Chevening, Sevenoaks, Kent.*

1860 *Stanhope, Walter Spencer, Esq. *Cannon-hall, Barnsley, Yorkshire.*

1856 Stanley, Edmund Hill, Esq. *Craven-hotel, Strand, W.C.*

1853 1780*Stanley, Edward Henry, Lord, M.P., D.C.L. 23, *St. James's-square, S.W.*

1863 Stanton, Geo., Esq. *Coton-hill, Shrewsbury; and Conservative Club, S.W.*

1867 Stanton, Henry, Esq. 1, *River-street, Myddleton-square, W.C.*

1856 Statham, John Lee, Esq. 60, *Wimpole-street, W.*

1863 *Staveley, Miles, Esq. *Old Sleningford-hall, Ripon.*

1867 Steel, J. P., Esq., Lieut. R.E. *Junior United Service Club, S.W.*

1830 *Stephen, Sir George. *Melbourne; care of Mr. H. W. Ravenscroft,* 7, *Gray's-inn-square, W.C.*

1857 Stephenson, Sir R. Macdonald, C.E. 72, *Lancaster-gate, W.; and East-cottage, Worthing.*

1866 Stepney, A. K. Cowell, Esq. 6, *St. George's-terrace, Knightsbridge, W.*

1860 Sterling, Col. Sir Anthony. *South-lodge, South-place, Knightsbridge, W.*

1862 1790Sterry, Henry, Esq. 7, *Paragon, Southwark, S.E.*

1855 Stevens, Henry, Esq., F.S.A. 17, *Henrietta-street, Covent-garden, W.C.*

1841 Stevenson, Thomas, Esq., F.S.A. 37, *Upper Grosvenor-street, W.*

1866 Stewart, Rev. Dr. James. *Lovedale, Alice, South Africa.*

1860 *Stewart, Major J. H. M. Shaw, Royal Madras Engineers.

1860 Stirling, Capt. Frederick H., R.N. *H.M.S. 'Hero;' and United Service Club, S.W.*

1863 Stirling, Sir Walter, Bart. 36, *Portman-square, W.*

1860 Stocker, John Palmer, Esq. 93, *Oxford-terrace, Hyde-park, W.*

1845 *Stokes, Rear-Admiral John Lort. *United Service Club, S.W.; and Scotchwell, Haverfordwest, Wales.*

1867 *Story, Edwin, Esq., M.A. 30, *Almorah-road, Downham-road, Islington, N.*

1866 1800Strachey, Colonel Richard, R.E., F.R.S. 29, *Lancaster-gate, Hyde-park, W.*

1861 Strange, Lieut.-Col. Alexander. 41, *Brompton-crescent, S.W.*

1858 Strangford, Percy Ellen, Viscount. 58, *Cumberland-street, W.*

1858 Stratford de Redcliffe, Stratford Canning, Viscount. 29, *Grosvenor-square, W.*

1864 Straton, N. D. J., Esq. *Aylestone, Leicester.*

1860 Strickland, Edward, Esq., C.B., Commissary-General. *New Zealand. Care of Messrs. Ridgway and Co.,* 2, *Waterloo-place, S.W.*

Year of Election.	
1865	Strong, F. K., Esq.,, K.H. *Hamburg, Germany; care of A. Strong, Esq., 43, Lincoln's-inn-fields, W.C.*
1853	Strutt, George H., Esq., F.R.A.S. *Bridge-hill, Belper.*
1858	Strutt, Captain Hammel Ingold, F.R.A.S. *Royal Mail Steam Packet Company, Southampton.*
1859	*Strutt, Captain William. 26, *Richmond-place, Southampton.*
1853	1810*Strzelecki, Count P. E. de, C.B., F.R.S. 23, *Savile-row, W.*
1859	Stuart, Lieut.-Col. J. F. D. Crichton, M.P. 25, *Wilton-crescent, Belgrave-square, S.W.*
1861	Stuart, Vice-Chancellor Sir John. 11 *and* 12, *Old-buildings, Lincoln's-inn, W.C.; 5, Queen's-gate, Hyde-park, W.; and Grushernish, Isle of Skye, Invernesshire.*
1866	Stuart, Major Robert. *Janina, Albania. Care of Messrs. Bull, Hunter, and Co., 52, Wigmore-street, W.*
1833	*Sturt, Capt. Charles, F.L.S. *St. Edmond's, Tivoli, Cheltenham.*
1862	Stutfield, William, Esq. 15, *Leinster-terrace, Hyde-park, W.; and Mystoke-park, Canterbury.*
1858	Sudeley, Lord. 5, *Seamore-place, Curzon-street, W.*
1857	Sulivan, Rear-Admiral Bartholomew J., R.N., C.B. *Board of Trade, S.W.*
1865	Sullivan, Capt. T. W., C.B., R.N. *Kimpton, Welwyn, Herts.*
1862	Surridge, Rev. Henry Arthur Dillon, M.A. 21, *Berners-street, W.*
1862	1820Surtees, Capt. Charles Freville, M.P. *Chalcott-house, Long Ditton, Surrey.*
1861	*Sutherland, George Granville William, Duke of. *Stafford-house, St. James's Palace, S.W.*
1840	*Sutherland, Robert, Esq. *Carmona Bank, Dunoon, Argyleshire.*
1857	Swanzy, Andrew, Esq. 38, *Cannon-street, E.C.*
1836	*Swinburne, Rear-Admiral Charles H. 18, *Grosvenor-place, W.; and Capheaton, near Newcastle-upon-Tyne.*
1862	*Swinburne, Lieut. Sir John, Bart., R.N. *Capheaton, Newcastle-on-Tyne.*
1863	Swinhoe, Robert, Esq., H.B.M. Consul, Formosa. *Care of Messrs. Smith, Elder, and Co.*
1859	Sykes, Christopher, Esq., M.P. *Sledmere, Malton.*
1851	Sykes, Colonel William Henry, M.P., F.R.S., Hon. M.R.I.A. *Athenæum Club, S.W.; and* 47, *Albion-street, Hyde-park, W.*
1864	Symonds, F., Esq., M.D. *Beaumont-street, Oxford.*
1852	1830*Synge, Col. Millington H., R.E. *Birmingham.*
1852	Tagart, Courtenay, Esq. *Reform Club, S.W.; and Paris.*
1859	Tagart, Francis, Esq. 31, *Craven-hill-gardens, Hyde-park, W.*
1866	Taintor, Edward C., Esq. (Impl. Chinese Customs). *Tientsin, China.*
1864	Tait, P. M., Esq. 162, *Adelaide-road, N.; and Oriental Club, W.*
1857	*Tait, Robert, Esq. 14, *Queen Anne-street, W.*
1867	Talbot, Right Hon. Richard Gilbert. 45A, *Chester-square, S.W.; and Ballinclow, Kingstown, County Dublin.*
1861	Talbot de Malahide, James Talbot, Lord. *Malahide Castle, Co. Dublin.*

Year of Election.	
1861	Tayler, Joseph Walter, Esq.
1861	Taylor, Commander A. Dundas, I.N. 6, *Nightingale-road, Lower Clapton, N.E.*
1865	1840Taylor, H. L., Esq. *Reform Club, S.W.; and* 23, *Phillimore-gardens, Kensington, W.*
1865	Taylor, Rev. Jas. Hudson. *Ningpo, China. Care of Mr. Berger, Saint-hill, East Grinstead.*
1863	Taylor, John, Esq. *Egremont-villa, Lower Norwood, Surrey, S.*
1854	*Taylor, John Stopford, Esq., M.D. 1, *Springfield, St. Anne-street, Liverpool.*
1863	Taylor, Col. R. C. H. 16, *Eaton-place, S.W.; and Carlton Club, S.W.*
1864	Taylor, W. R., Esq.
1857	Teesdale, John M., Esq. *Eltham-house, Eltham, S.E.*
1863	Tegg, Wm., Esq. 13, *Doughty-street, Mecklenburg-square, W.C.*
1860	Templeton, John, Esq. 24, *Budge-row, E.C.*
1857	Tennant, Professor James. 149, *Strand, W.C.*
1859	1850Tennant, Major J. F., Bengal Engrs. *Director of the Observatory, Madras. Care of Messrs. Smith, Elder, and Co., Cornhill.*
1830	*Thatcher, Colonel E.I.C.
1865	Theed, William S., Esq. 18, *Carlisle-terrace, Kensington, W.*
1863	Thomas, G., Esq. *Queen's-gardens-terrace, Hyde-park, W.*
1854	Thomas, Henry Harrington, Esq. *Lansdowne-crescent, Bath.*
1864	Thomas, J. R., Esq., Staff Assist. Surg. *Castle-hill, Fishguard, Pembrokeshire.*
1865	Thomas, John H., Esq. *Custom-house, E.C.*
1854	Thompson, William C., Esq.
1863	Thomson, James, Esq. *Dunstable-house, Richmond.*
1863	Thomson, James Duncan, Esq., Portuguese Consul. *St. Peter's-chambers, Cornhill, E.C.*
1848	1860*Thomson, J. Turnbull, Esq., Chief Surveyor. *Otago, New Zealand.*
1866	Thomson, John, Esq. 4, *Montague-street, Edinburgh. Care of John Little, Esq.*, 21, *Cannon-street, E.C.*
1861	*Thomson, Ronald Ferguson, Esq., 1st Attaché to the Persian Mission. *Care of F. B. Alston, Esq., Foreign-office, S.W.*
1854	*Thomson, Thomas, Esq., M.D., F.R.S. *Hope-house, Kew, W.*
1865	Thomson, W. T., Esq. 21, *James-street, Buckingham-gate, S.W.*
1862	*Thorne, Augustus, Esq. 4, *Cullum-street, City, E.C.*
1867	Thornton, Edward, Esq., C.B. *Harrow.*
1847	Thornton, Rev. Thomas Cooke, M.A., M.R.I. *Brock-hall, near Weedon, Northamptonshire.*
1858	Thorold, Rev. A. W. 16, *Bedford-square, W.C.*
1854	Thorold, Henry, Esq. *Cuxwold, Lincolnshire.*
1865	1870Thring, Henry, Esq. 5, *Queen's-gate-gardens, W.*
1861	Thrupp, John, Esq.
1859	Thuillier, Lt.-Col. H. L., Surveyor-General of India. *Calcutta; Messrs. Grindlay, and Co.; Care of J. Walker, Esq., India Office.*
1865	Thurburn, C. A., Esq. 29, *Queensborough-terrace, Kensington-gardens, W.*

Year of Election.	
1864	*Thurburn, Hugh, Esq. 108, *Westbourne-terrace, W.*
1861	Thurlow, the Hon. Thos. J. Hovell. *British Embassy, The Hague. Care of J. B. Alston, Esq., Foreign Office, S. W.*
1846	*Tindal, Charles John, Esq. *New South Wales.*
1839	*Tinne, John A., Esq. *Briarley, Aigburth, near Liverpool.*
1862	Todd, John, Esq. *Sydney. Messrs. Bligh and Harbottle, 1, Alderman-walk, E.C.*
1865	Todd, Rev. John W. *Tudor-hall, Forest-hill, Sydenham, S.*
1853	1880*Tomlin, George Taddy, Esq., F.S.A. *Combe-house, Bartonfields, Canterbury; and Windham Club, S. W.*
1853	Tomline, George, Esq., M.P. 1, *Carlton-house-terrace, S. W.*
1835	*Tooke, Arthur Wm., Esq., M.A. *Pinner-hill-house, near Watford, Middlesex.*
1856	Torrance, John, Esq. 5, *Chester-place, Hyde-park-square, W.*
1866	Torrens, Robert Richard., Esq. 2, *Gloucester-place, Hyde-park, W.; and The Cott, Holm, near Ashburton, South Devon.*
1859	Townsend, Commander John, R.N. *Lona, Weston-super-Mare.*
1866	Townson, Wm. Parker, Esq., B.A. Cantab. *Care of Miss Townson, Ash-house, Caton, near Lancaster.*
1846	*Towry, George Edward, Esq.
1858	Towson, J. Thomas, Esq. *Secretary Local Marine Board, Liverpool.*
1864	*Toynbee, Capt. Hy. *Commanding the East-India Ship 'Hotspur;' 25, Inverness-road, Kensington-gardens, W.*
1863	1890*Tozer, Rev. H. F., M.A. *Exeter College, Oxford.*
1864	Tracy, the Hon. C. H. 11, *George's-street, W.*
1863	*Travers, Arch., Esq. *Addison-road (opposite the Napier-road), Kensington, W.*
1867	Tremenheere, Col. C.W., R.E. *Bombay.*
1859	Tremlett, Rev. Francis W., M.A. *Belsize-park, Hampstead, N. W.*
1865	*Trench, Capt. the Hon. Le Poer, R.E. 32, *Hyde-park-gardens, W.; and Ordnance Survey Office, Pimlico, S. W.*
1863	Trestrail, Rev. Frederick. *Stanmore-villa, Beulah-hill, Upper Norwood, S.*
1862	Trevelyan, Sir Charles Edward, K.C.B. 8, *Grosvenor-crescent, S. W.*
1830	Trevelyan, Sir Walter Calverly, Bart., M.A., F.S.A., F.L.S., F.R.S.N.A., &c. *Athenæum Club, S. W.; Wallington, Northumberland; and Nettlecombe, Somerset.*
1864	Trimmer, Edmund, Esq. *Care of Messrs. Trimmer and Co., New City-chambers, Bishopsgate-street, E.C.*
1867	1900Tritton, Joseph Herbert, Esq. *Bloomfield, Norwood; and 54, Lombard-street, E.C.*
1867	Tryon, Capt. George, R.N. *Army and Navy Club, S. W.*
1862	Tuckett, Francis Fox, Esq. *Frenchay, near Bristol.*
1835	*Tuckett, Frederick, Esq. 4, *Mortimer-street, Cavendish-square, W.*
1865	Tuckett, Philip D., Esq. 113, *Piccadilly, W.*
1852	Tudor, Edward Owen, Esq., F.S.A. 80, *Portland-place, W.*
1857	Tudor, Henry, Esq. 80, *Portland-place, W.*
1864	Turnbull, George, Esq., C.E., F.R.A.S. 23, *Cornwall-gardens, South Kensington, W.*
1834	*Turnbull, Rev. Thos. Smith, F.R.S. *University Club, S. W.; and Blofield, Norfolk.*
1863	Turner, Thos., Esq. *Guy's Hospital, Southwark, S.*

Year of Election.

1867 1910 Tweedie, Capt. Michael, R.A. *Care of Messrs. Cox and Co., Craig's-court, S.W*
1864 *Twentyman, A. C., Esq. *Tettenhall-wood, near Wolverhampton.*
1863 Twentyman, Wm. H., Esq. *Manor-house, St. John's-wood, N.W.*
1863 *Twiselton, Hon. E. F. *Rutland-gate, S.W.*
1849 Twiss, Sir Travers, D.C.L., F.R.S. 19, *Park-lane, W.*
1858 Twyford, Capt. A. W., 21st Hussars. *Reform Club, S.W.; and Cosham-house, Cosham, Hants.*
1865 Tyer, Edward, Esq., C.E., F.R.A.S. 15, *Old-jewry-chambers, E.C.*
1862 *Tyler, George, Esq. 24, *Holloway-place, Holloway-road, N.*
1859 Tytler, Capt. W. Fraser. *Aldowrie, Inverness.*

1862 Underhill, Edward Bean, Esq., LL.D. *Derwent-lodge, Thurlow-road, Hampstead, N.W.*
1861 1920 Ussher, John, Esq. *Arthur's Club, St. James's Street, S.W.*
1858 *Uzielli, Theodosius, Esq.

1844 *Vacher, George, Esq. *Manor-house, Teddington.*
1862 *Vander Byl, P. G., Esq. *Care of Mr. H. Blyth*, 17, *Gracechurch-street, E.C.*
1865 Vane, G., Esq. *Ceylon. Messrs. Price and Boustead.*
1856 *Vaughan, James, Esq., F.R.C.S., Bombay Army. *Builth, Breconshire.*
1861 Vaughan, J. D., Esq., Assist. Res. Councillor and Police Magistrate of Singapore. *Care of J. Tupp, Esq.*, 4, *Lancaster-road, Notting-hill, W.*
1861 Vaughan, Nash Vaughan Edwards, Esq. *Rheola, near Neath; and Lanelay, near Pontyfield, Glamorganshire.*
1849 Vaux, William S. W., Esq., M.A., F.S.A. *British Museum, W.C.*
1852 *Vavasour, Sir Henry M., Bart. 8, *Upper Grosvenor-street, W.*
1855 1930 Vavasseur, James, Esq. *Knockholt, near Sevenoaks, Kent.*
1867 Venner, Capt. Francis John S. 42, *Gloucester-place, Hyde-park, W.; and Elm Bank, near Worcester.*
1863 *Vereker, the Hon. H. P., LL.D., H.M. Consul at Rio Grande do Sul. 1, *Portman-square, W.*
1862 Verner, Edward Wingfield, Esq., M.P. 86, *Eaton-square, S.W.; and Cook-abbey, Bray, Co. Wicklow.*
1862 *Verney, Edmond H., Commr. R.N. 32, *South-street, Grosvenor-square, W.*
1837 *Verney, Major Sir Harry C., Bart., M.P., F.R.A.S. *Travellers' Club, S.W.*; 32, *South-street, Grosvenor-square, W.; and Claydon-house, Bucks.*
1857 Verrey, Charles, Esq.
1852 Verulam, James Walter, Earl of. *Gorhambury, near St. Alban's; Barry-hill, Surrey; and Messing-hall, Essex.*
1865 Vile, Thomas, Esq. 75, *Oxford-terrace, W.*
1865 Vincent, Minos C., Esq., C.E. *Frankfort, Ohio, U.S., and* 337, *Strand.*

Year of Election.	
1857	1940Vincent, John, Esq. 4, *Granville-park, Blackheath, S.E.*
1858	Vines, William Reynolds, Esq., F.R.A.S. *Care of R. P. Hollyer, Esq.*, 25, *Douglas-road-north, Canonbury, N.; and* 4, *Thavies-inn, Holborn-hill, E.C.*
1863	Vivian, Major Quintus, late 8th Hussars. 17, *Chesham-street, S.W.*
1838	*Vyvyan, Sir Richard Rawlinson, Bart., F.R.S. *Trelowarren, Cornwall.*
1852	Wade, Mitchell B., Esq. 66, *South John-street, Liverpool.*
1864	Wade, R. B., Esq. 58, *Upper Seymour-street, Portman-square, W.*
1863	Wade, Thos. F., Esq., C.B., H.B.M. Secretary of Legation. *Pekin, China.*
1853	*Wagstaff, William Racster, Esq., M.D., M.A.
1863	Waite, Henry, Esq. 3, *Victoria-street, Pimlico, S.W.*
1864	Wakefield, E. T., Esq. 40, *Pembridge-villas, Bayswater, W.*
1862	1950Walker, Col. C. P. Beauchamp, C.B. 97, *Onslow-square, S.W.; and United Service Club, S.W.*
1861	Walker, Edward Henry, Esq., Vice-Consul at Tripoli. *Newton-bank, Chester.*
1863	*Walker, Frederick John, Esq. *Thornbury-house, Thornbury, Bristol.*
1863	Walker, James, Esq., Managing Director of Madras Railway. 23, *Cambridge-square, Hyde-park, W.*
1859	*Walker, Lt.-Col. James, Bombay Engineers. *Murree, near Rawul Pindé, Punjab. Care of J. Walker, Esq., India Office.*
1830	Walker, John, Esq., Hydrog. India Office. 9, *Castle-street, Holborn, W.C.*
1861	*Walker, John, Esq. 60, *Porchester-terrace, W.*
1858	*Walker, Captain John, H.M.'s 66th Foot. *Broom-hill, Colchester.*
1864	Walker, R. B. N., Esq. *Care of Mr. Blissett*, 38, *South Castle-st., Liverpool.*
1860	Walker, Robert, Esq., M.D., Ass. Surg. R.N. 4, *Bellfield-place, Portobello, Edinburgh.*
1866	1960Walker, Sydney, Esq.
1863	*Walker, T. F. W., Esq. 6, *Brock-street, Bath; and Athenæum Club, S.W.*
1853	Walker, Captain William Harrison, H.C.S. 3, *Gloucester-terrace, W.; and Board of Trade, S.W.*
1861	Walker, Rev. William. *Grammar-school, Hanley Castle, Upton-on-Severn.*
1861	Walker, Rev. William Henry, M.A. *Necton-rectory, Shipham, Norfolk.*
1866	Walker, William, Esq., F.S.A. 48, *Hilldrop-road, Tufnell-park, N.*
1854	Wallace, Alfred Russell, Esq. 9, *St. Mark's-crescent, Regent's-park, N.W*
1861	Wallace, Rev. Charles Hill, M.A. 3, *Harley-place, Clifton, Bristol.*
1864	Waller, Horace, Esq. *Haven-green, Ealing, W.*
1865	Waller, Sir Thos. Wathen, Bart. 16, *Eaton-square, S.W.*
1863	1970Wallich, George C., Esq., M.D. 11, *Earl's-terrace, Kensington, W.*
1864	Walmsley, Sir Joshua, Government Resident Agent. *Natal.*
1860	Walpole, Capt. the Hon. F. *Travellers' Club, S.W.; and Rainthorpe-hall, Long Stratton, Norfolk.*
1863	Walpole, Rt. Hon. Spencer, M.P. *Grafton-street, W.; and Ealing, W.*
1853	Walter, Henry Fraser, Esq. *Papplewick-hall, near Nottingham.*

Year of Election.	
1865	Walton, H. C., Esq., C.E. 26, *Savile-row, W.*
1863	Walton, J. W., Esq. 26, *Savile-row, W.*
1864	Walton, R. G., Esq., C.E.
1853	*Ward, George, Esq.
1860	Ward, Admiral J. Hamilton. *Oakfield, Wimbledon-park, S.W.*
1865	1980Ward, Swinburne, Esq., Civil Commissioner. *Seychelles Islands.*
1862	Wardlaw, John, Esq. 57, *Prince's-gate, Kensington, W.*
1864	Warner, E., Esq., M.P. *Higham-hall, Woodford, Essex; and* 49, *Grosvenor-place, S.W.*
1859	Warre, Arthur B., Esq. 109, *Onslow-square, S.W.*
1862	Warren, Capt. Richard Pelham. *Worting-house, Basingstoke.*
1867	Waterhouse, George Marsden, Esq. *Buckhurst, Wokingham, Berkshire.*
1852	Watkins, John, Esq., F.R.C.S., F.S.A. 2, *Falcon-square, Aldersgate-street, E.C.*
1862	Watney, John, Esq. 16, *London-street, Fenchurch-street, E.C.*
1859	Watson, James, Esq. 24, *Endsleigh-street, W.C.*
1860	Watson, James, Esq., Barrister-at-Law. 13, *Circus, Bath.*
1861	1990Watson, John Harrison, Esq. 28, *Queensborough-terrace, Kensington-gardens, W.*
1867	Watson, Robert Spence, Esq. *Moss Croft, Gateshead-on-Tyne.*
1853	Watts, J. King, Esq. *St. Ives, Huntingdonshire.*
1857	*Waugh, Maj.-General Sir Andrew Scott, Bengal Engineers, F.R.S., late Surveyor-General and Superintendent Great Trig. Survey. *Athenæum Club, S.W.; and* 7, *Petersham-terrace, Queen's-gate-gardens, South Kensington, W.*
1861	Way, Arthur, Esq. *Ashton-lodge, Ashton, near Bristol.*
1858	*Webb, Capt. Sydney. *Oriental Club, Hanover-square, W.; and* 24, *Manchester-square, W.*
1862	*Webb, William Frederick, Esq.
1836	*Webber-Smith, Colonel James, 95th Regiment. 14, *Cambridge-square, W.*
1865	Webster, Alphonsus, Esq. 44, *Mecklenburg-square, W.C.*
1864	Webster, E., Esq. *North-lodge, Ealing, W.*
1858	2000Webster, George, Esq., M.D. *Dulwich, S.*
1866	Webster, George, Esq. 40, *Finsbury-circus, E.C.*
1860	Weguelin, Thomas Matthias, Esq., M.P. *Peninsular and Oriental Steam Navigation Co., Moorgate-street, E.C.*
1851	Weller, Edward, Esq. 34, *Red-lion-square, W.C.*
1853	*Wellington, Arthur Richard, Duke of, Major-General, D.C.L. *Apsley-house, W.; and Strathfieldsaye, Hampshire.*
1864	Wells, Sir Mordaunt, late Chief Puisne Judge, Bengal. 107, *Victoria-st., S.W.*
1862	Wells, William, Esq. 22, *Bruton-street, W.; and Redleaf, Penshurst, Kent.*
1863	Welman, Chas., Esq. *Norton-manor, Taunton.*
1857	West, Lieut.-Colonel J. Temple.
1861	West, Rev. W. De Lancy, M.A., Head Master, Grammar School. *Brentwood, Essex.*
1863	2010*Westlake, John, Esq. 16, *Oxford-square, W.*
1853	Westmacott, Arthur, Esq. *Athenæum Club, S.W.*

Year of Election.	
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..... Kaukasischen Landern. Map. 4to. Tiflis, 1865. — The Author.

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..... Australia. 12mo. — Society for Promoting Christian Knowledge.

Annales de la Prop. de la Foi. 23 vols. 8vo. Paris, 1825. — By Purchase.

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Argentine Railway Company Reports. 1866. — The Directors.

Astronomia del Rey Don Alphonso, Rey de Castilla. Folio. Madrid, 1866. — Academy of Madrid.

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Australia, Statistical Register of South Australia for 1865. — F. S. Dutton, Esq.

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Boston Society of Natural History.	The Society.
Journal of the Franklin Institute.	The Institute.
Proceedings of the American Academy.	The Academy.
Proceedings of the American Geographical and Statistical Society of New York.	The Society.
Proceedings of the Academy of Natural Sciences of Philadelphia.	The Academy.
Reports of U.S. Sanitary Commission. Washington.	
Smithsonian Contributions to Knowledge.	The Institute.
Smithsonian Miscellaneous Collections.	The Institute.
Smithsonian Report. 8vo.	The Institute.
The Canadian Naturalist and Geologist, with Proceedings of Natural History Society of Montreal.	The Society.

Mexico—

Boletin de la Sociedad Mexicana.	The Society.

ACCESSIONS TO THE MAP-ROOM.

From May 28th, 1866, to May 27th, 1867.

ATLASES.

Maps, Charts, &c. — *Donors.*

Hand-Atlas über alle Theile der Erde und über das Weltgebäude. Erste Ausgabe, 1817. Jubel Ausgabe, 1867, herausgegeben von Adolf Stieler. Gotha. 42 maps. — Justus Perthes, Esq.

Geographischer Hand-Atlas über alle Theile der Erde. By Dr. Henry Lange. Leipzic, 1865. On 30 sheets.

Historisch-Geographischer Hand-Atlas. By Dr. Karl von Spruner. Gotha, 1865. 31 maps with letterpress. — Justus Perthes, Esq.

Atlas of Geography. In 2 vols. By N. Visscher and F. de Wit. Amsterdam, 1650. — Purchased.

Imperial Atlas of England and Wales. By A. Fullarton and Co. London, 1866. Parts 3, 4, and 5. Scale 1 inch = 4 miles (stat.). — The Authors.

Atlas von Sachsen; ein Geographisch-Physikalisch-Statistisches Gemälde des Königreichs Sachsen. By Dr. Henry Lange. Leipzic, 1860. 12 maps with letterpress.

Schul-Atlas von Königreich Sachsen fur den gebrauch der Schüler beim Unterricht in der Vaterlandischen Geographie. By Dr. Henry Lange. Leipsic, 1860. 3 maps. Scale 1 inch = 11·2 miles (geo.).

General Missionary Atlas from Original Sources. By Rev. R. Grundemann, Ph.D. Part I. West Africa. Justus Perthes. Gotha, 1867. 2 copies. 1 German, 1 English. — Justus Perthes, Esq.

Atlas of Upper and Lower Canada. By Joseph Bouchette. London, 1831. — Dr. Macloughlin.

THE WORLD.

Chart of the World on Mercator's Projection. Constructed by Herman Berghaus and Fr. v. Stülpnagel. Gotha, 1867. — Justus Perthes, Esq.

EUROPE.

25 Sheets of G. D. Reymann's Map of Central Europe. Scale 1 : 200,000. viz.:—

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,, 8*c*. Ripen.
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Map of the Scene of the late Battles in Bohemia. Photo-zincographed at the Ordnance Survey Office, Southampton, 1866. Scale 1 inch = 2 miles (geo.). The Sec. of State, War Office.

Magyar Korona. Tartományai Fali Abrosza a magyarországi ev reform egyházkerületek egyetemes tanügyi bizottonánya megrendeléséböl tervezte Berghaus. Armin és Gönczy Pál. Gotha, 1866. Scale Justus Perthes, Esq.

General-karte der Markgrafschatz Mähren mit den Antheilen des Herzogthums Schlesien. Photo-zincographed at the Ordnance Survey Office, Southampton, 1866. On 4 sheets. Scale 1 inch = 4 miles (geo.). The Sec. of State, War Office.

Environs of Feldsberg, from the Austrian Government Map. Photo-zincographed at the Ordnance Survey Office, Southampton, 1866. Scale 1 inch = 2 miles (geo.). The Sec. of State, War Office.

Environs of Vienna and Presburg, from the Austrian Government Map. Photo-zincographed at the Ordnance Survey Office, Southampton, 1866. Scale 1 inch = 2 miles (geo.). The Sec. of State, War Office.

Originalkarte des Sulden-Gebictes. Von Julius Payer. Gotha, 1867. A. Petermann, Esq.

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Ordnance Maps—1-inch scale (Kingdom).

England and Wales—

Sheets 102 n.w. and n.e.; 109 s.e.; and 110 s.e. (Hills).

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Scotland—

Co. Ayr, Index.

Co. Perth, Sheets 94, 95, 98, 99, 100, 103, 104, 105, 106, 107, 108, 109, 110, 111, 114, 115, 116, 117, 118, 119, 120, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 139, 140, 141, 142, and 143.

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202 Sheets; viz., Alnwick, Carlisle, Cockermouth, Hanley, Maryport, Morpeth, Plumstead, Ryde, Sheerness, Uxbridge, Whitehaven, Wigton, and Workington.

Scotland—

50 Sheets; viz., Alexandria, Alloa, Dumbarton, Kirkintillock, and Montrose.

Total .. .. 2174 sheets.

The Ordnance Survey Office, Southampton, through Sir H. James, R.E., Superintendent.

Black's new large Map of England and Wales, according to the Ordnance and Admiralty Surveys. On 16 sheets. By J. Bartholomew, F.R.G.S. 1866. Scale 1 inch = 4 miles. The Author.

London.—A new Map of Metropolitan Railways and Miscellaneous Improvements, sanctioned in 1866. By E. Stanford. London, 1866.

A new Map of Metropolitan Railways and Miscellaneous Improvements deposited at the Private Bill Office, Nov. 30th, 1866, for Session 1867. By E. Stanford. London, 1867. Scale 1 inch = 0·43 mile (geo.). The Author.

Hislop's new Plan of the City of Edinburgh and Leith, with Suburbs, &c. from the Ordnance Surveys, &c. By J. Bartholomew, F.R.G.S. 1866. Scale 6 inches = 1 mile.

Plan of the City of Glasgow, with Suburbs, from Ordnance Surveys, &c. By J. Bartholomew, F.R.G.S. 1866. Scale 6 inches = 1 mile.

Black's large Map of Ireland: the S.W. sheet. By J. Bartholomew. 1866. Scale $\frac{1}{4}$ inch = 1 mile. The Author.

France—

Carte Hydrologique du Département de la Seine. On 4 sheets. By M. Delesse. 1862. Scale 1 inch = 0·38 mile (geo.).

Carte Géologique du Département de la Seine publiée d'après les ordres de M. le Baron G. E. Haussmann, Senateur Préfet de la Seine, par M. Delesse, Ingénieur des Mines du Département de la Seine. Paris, 1865. On 4 sheets. Chromo-lithographed. Scale 1 inch = 0·34 mile (geo.). The Author.

Germany—

Karte von Deutschland. 3 sheets. Von Adolf Stieler. Gotha, 1867. Justus Perthes, Esq.

Map of the Seat of War in Germany. E. Stanford, Esq.

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18. A General Map from Jacin to Königgratz. Scale 1 inch = 0·38 mile (geo.). Col. B. Walker.

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Map of Greece and the Archipelago. By Dr. A. Petermann. Gotha, 1867. The Author.

Enlarged Plan of the Kaimenis or Burnt Islands (in the Crater of Santorin Island), showing the extension of Neo Kaimeni, and the different Soundings in its vicinity, caused by the two recent eruptions. By J. W. H. Harvey, Master, H.M.S. *Gibraltar*, 1866. Scale 1 inch = $\frac{1}{3}$ of a mile. Com. L. Brine, H.M.S. *Racer*.

Italy—

Nuova Carta generale del Regno d' Italia colla Divisione amministrativa attuale per l' insignamento della geografia nelle scuole di L. Schiaparelli e C. & E. Mayr. Gotha, 1864. Scale

Justus Perthes, Esq.

Map of Venetian Lombardy. On 4 sheets. Copied by the anastatic process in 1859. at the Ordnance Survey Office, Southampton. Scale 1 inch = $4\frac{1}{2}$ miles.

Venetia: a Revised Map of the Quadrilateral. Scale 1 inch = 1·4 mile.

Secretary of State for War.

Prussia—

Geologische Karte der Rheinprovinz und der Provinz Westfalen, im Auftrage des Königl. Ministeriums für Handel, Gewerbe und öffentliche Arbeiten, Herrn von der Heydt, mit Benutzung der Beobachtungen der Königl. Bergbeamten, und der Professoren Becks, Girard und F. Roemer, nach der Gradabtheilungskarte des Königl. Generalstabes ausgeführt durch Dr. H. von Dechen, Königl. Berghauptmann. Sheets 26, 29, 32, and 33. Scale 1 inch = 1·09 mile.

Russia—

Russland und Skandinavien. By A. Petermann. Gotha, 1867. Scale 1 inch = 139 miles (geo.). The Author.

Karten zur Skizze der orographischen und hydrographischen Verhoholtnisse von Liv- Esth- und Kurland. Ein geographischer Versuch von Dr. K. Rathlef. Reval, 1852. 4 maps. Scale 1 inch = 16·4 miles (geo.). Professor P. Chaix.

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Four Maps in Russian Characters.
1. Map of the Government of Moscow.
2. „ „ „ Nischni Novgorod.
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St. Petersburg, 1829. W. Spottiswoode, Esq.

Süd-Russland und Kaukasien.
Süd-West-Russland und die Türkei.
By A. Petermann. Gotha, 1867. Scale 1 inch = 50 miles (geo).
The Author.

Saxony.

Geologische Karte der Provinz Sachsen von Magdeburg bis zum Harz. Published on 4 sheets. Sheets 2 and 4 only supplied. By Julius Ewald. Berlin, 1865. Scale 1 inch = 1·36 mile (geo.).

Spain.

Les Monts Maudits (Pyrenees). By C. Packe. London, 1866.
E. Weller, Esq.

Sweden—

Three Sheets of the Geological Map of Sweden.
III. O. 31 s.e. Ramnus.
I. W. 36 n.e. Wargada.
I. O. 36 s.w. Ulricemann.
And Index Sheet and letterpress. Scale 1 inch = 0·68 mile (geo.).
Professor Axel Erdmann,
Bureau Recherche Géologique de la Suéde.

Öfversigt Karta öfver Södra Delen af Sverige, Scale 1 inch = 13·95 miles (geo.)
Professor Axel Erdmann,
Bureau Recherche Géologique de la Suéde.

Karta öfver Nyköpings Län utgifven af Topografiska. Corpsen, 1866. Scale 1 inch = 2·79 miles (geo.).
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Nine sheets of Dufour's Atlas of Switzerland, corrected to 1866, viz. :—
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„ 10. Feldkirch and Arlberg.
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Carte Topographique du Canton de Genève, levée par ordre du Gouvernement 1837-8. Par Gen. G. H. Dufour. Scale 1 inch = 0·38 mile (geo.). On 4 sheets. Professor P. Chaix.

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Kultur-Karte von Java. Hauptsächlich nach Dr. F. Junghuhn. Scale 1 inch = 55·3 miles (geo.). By A. Petermann. Gotha, 1866.
The AUTHOR.

BELOOCHISTAN—

The Mekran Coast from Kurrachee to Gwadur, with Lieut. Ross' route from Gwadur to Kurrachee. Scale 1 inch = 13½ miles (geo.).
Lieut.-Col. GOLDSMID.

CHINESE EMPIRE—

China (Östl. Theil), Korea, und Japan, im Maassstabe von 1 : 7,500,000. Von A. Petermann. Gotha, 1867. The AUTHOR.

Diagram of Chinese Tartary. Constructed by Capt. C. George, R.N., and Mr. E. C. Oulet, from the most recent authorities. May, 1867. Size 9 ft. by 16 ft. Scale 3¾ inches = 1 degree.
Capt. SHERARD OSBORN, R.N., C.B.

A Chinese Map of China, on 64 sheets.

A Chinese Map of the Province of Shan-si. Dr. J. LAMPREY.

Map of the Inner City of Pekin, on silk. 1866.
HENRY KOPSCH and EDWARD TAINTOR, Imperial Customs Service.

Plan of the English Settlement at Shanghae. Surveyed, lithographed, and published in 1864–6, by order of the Municipal Council of Shanghae. Scale 1 inch = 200 feet. J. POOK, Esq., F.R.G.S.

INDIA—

Results of a Scientific Mission to India and High Asia. Part 4. By Hermann de Schlagintweit, Sakünlünski Adolphe, and Robert de Schlagintweit. London, 1866. SECRETARY OF STATE FOR INDIA.

Map of the Tea Countries of Assam and Cachar. By Major Briggs, late Superintendent Engineers. By W. and A. K. Johnston. Edinburgh. Scale 1 inch = 12 miles (stat.). A. K. JOHNSTON, Esq.

Map of the Eastern Portion of British Burmah and Burmah Proper, showing various Routes from Moulmain to the Shan States. Compiled by W. Montgomerie, Esq., from authentic documents, MS. October, 1862. Scale 1 inch = 7 miles (geo.).
Col. A. FYTCHE, Commissioner of Tennasserim.

Irrigation Map of the Madras Presidency, compiled from information furnished by superintending Engineers for the Secretary of State for India. Scale 1 inch = 8 miles.

Outline Map of the Madras Presidency, to illustrate the projects contained in the proposed Budget for 1866-67. Scale 1 inch = 12 miles.
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Province of Martaban, from Martaban to Toungngoo. Surveyed and compiled by A. Hobday, from 1853 to 1856 in charge of Survey Martaban Province. Moulmain, 1856. Scale 1 inch = 3·47 miles.
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Map of the Province of Pegu. Compiled by Lieut. E. C. Williams, Engineers and Officers of the Pegu Survey, from all available information. December, 1855. Scale 1 inch = 7 miles (geo.).
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Eight Maps of part of the Punjaub. By Capt. D. R. Robinson, Bengal Engineers. 1853 to 1857. Scale 1 inch = 1 mile.

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„ 3. „ Jhilam.
„ 4. „ Rawul Pindi.
„ 5. „ Rawul Pindi and Jhilam.
„ 6. „ Jhilam and Shahpoor.
„ 7. „ Rawul Pindi, Jhilam, and Shahpoor.
„ 8. „ Jhilam, Shapoor, and Leia.

Lieut.-Colonel D. R. Robinson, Bengal Engineers.

Map of the Neilgherries, Koondahs, and Wynaad, to illustrate the progress of Cinchona Cultivation up to July, 1866. By Clements R. Markham. Scale 1 inch = 2 miles (stat.). The Author.

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Japanese Map of the Empire of Japan.
Japanese Map of the City of Yedo. J. S. Coysh, Esq., F.R.G.S.

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Sketch Map shewing the Route taken by Mr. Colvill from Bushire, following the Coast-line to the Port of Lingah. Scale 1 inch = 13·6 miles (geo.).

Rough Map of Lieut.-Col. Goldsmid and Major Smith's Route from Ispahan to Choubar and Bunder Abbas. Scale 1 inch = 36 miles (geo.). Lieut.-Col. Goldsmid.

Russia—

Map of the Khirghiz-Steppe and Regions of the Orenburg and Siberian Khirgizes, &c., conterminous with the Central Asiatic Possessions. Scale 1 inch = 57 miles (geo.). Secretary of State, War Office.

Siam—

Outline Map showing the Boundary of the Siamese and British Territories. Kraa, May 19th, 1864. Scale 1 inch = 32 miles (geo.). 2 copies. Col. A. Fytche.

Turkestan—

Central Asia, mapped on the basis of the most recent Surveys that have been made by British and Russian Officers. Compiled under the superintendence of Lieut.-Col. J. T. Walker, R.E., Superintendent of Great Trigonometrical Survey of India, 1866. Scale 1 inch = 42 miles (geo.). C. R. Markham, Esq.

A Tracing of the Southern Portion of the Sea of Aral, showing the Delta of the Amu Daria, or Oxus River, from a Russian Pamphlet. Map-Room, R.G.S.

Turkey—

Sketch Map of a Journey made in August, September, and October, 1866. Showing the Sources and Course of the river Lycus, and its principal Tributary, the Koat or Kara Hissar Su. Also Sources of Kizzil Irmak or Halys, and those of the Mezoor or Deyrsim River, and the Tchimishgezek Su. With Route through the Deyrsim Dagh. By Consul J. E. Taylor. Diarbekr, 1867. Scale 1 inch = 7 miles (geo.). The Author.

Carte de l'Asie Mineure, contenant les Itineraires de P. de Tchihatchef, en 1847-63, tracé par H. Kiepert. Scale 1 inch = 27·4 miles (geo.). A. Petermann, Esq.

Carte Géologique de l'Asie Mineure. Par P. de Tchihatchef. Gotha, 1867. Scale 1 inch = 27·4 miles (geo.). Sir R. I. Murchison, Bart., President R.G.S.

Maps, Charts, &c. *Donors.*

Trigonometrical Survey of part of Mesopotamia from Sheriat el Beytha to Tel Ibrahim, with the Rivers Euphrates and Tigris. By Commander W. B. Selby and Lieut. J. B. Bewsher, I.N. 1862-5. Scale 1 inch = 2 miles (geo.).

Map of the Holy Land. Constructed by C. W. M. Van de Velde, late Lieut. Dutch R.N. On 8 sheets, with pamphlet. 2nd edition. Gotha. 1865. JUSTUS PERTHES, Esq.

Carte de la Terre Sainte, dessinée par A. de Mandrot, Lieut.-Colonel à l'Etat Major fédéral, d'après Van de Velde, Berghaus, &c. 1867. Scale 1 inch = 13 miles (geo.). Prof. P. CHAIX.

Carte du Cours inférieur du Jourdain, de la Mer Morte et des regions qui l'avoisinent. Dressée par Lieut. Vignes et Dr. Combe pendant leur voyage avec M. le Duc de Luynes en 1864. Paris, 1865. Scale 1 inch = 3·28 miles (geo.). The AUTHOR.

Carte du Wady Arabah et du Lit du Wady el Jeib. Dressée par Lieut. Vignes et Dr. Combe pendant leur voyage avec M. le Duc de Luynes en 1864. Paris, 1865. Scale 1 inch = 3·28 miles (geo.). The AUTHOR.

Originalkarte des Theiles von Palästina zwischen Jaffa und Jerusalem, mit besonderer Berucksichtigung dervorhandenen und projektirten Communicationen, nach Originalzeichnungen und mit Benutzung der Nuesten Aufnahmen und Forschungen, von Conrad Schick. A. Petermann, Gotha, 1867. Scale 1 inch = 1·6 miles (geo.).
Dr. A. PETERMANN.

AFRICA.

GENERAL—

Stanford's Library Map of Africa, constructed by A. Keith Johnston, F.R.G.S. London, 1866. Scale 1 inch = 94·34 miles (stat.).
E. STANFORD, Esq.

EASTERN—

Sketch showing the Discoveries of Captains Burton, Speke, and Grant, and Sir S. W. Baker, and their relation to the Sources of the Nile. By A. G. Findlay, Esq. 1867. A. G. FINDLAY, Esq., F.R.G.S.

WESTERN—

River Volta,—Das Südwestliche Ewe-Sprachgebeit nach Original-Zeichmungen der Missionare Ch. Hornberger und W. Brutschin, und den neuesten Englischen Aufnahmen der Küste und des Volta Flusses. By A. Petermann. Gotha, 1867. Scale 1 inch = 8·8 miles (geo.).
A. PETERMANN, Esq.

Maps illustrating M. du Chaillu's Route in Equatorial Africa. 1864-65. Scale 1 inch = 10·2 miles (geo.). The AUTHOR.

Angola,—Mappa Coordenado pelo Visconde de Sá da Bandeira, Tenente General Ministro da Guerra, e por Fernando da Costa Leal, Tenente Coronal de Mossamedes. Lisboa, 1863.
Commodore A. P. E. WILMOT, C.B.

SOUTHERN—

Das Capland nebst den Süd-Afrikanischen Freistaaten und dem Gebiet der Hottentotten und Kaffern. Von A. Petermann. Gotha, 1865. Scale 1 : 5,000,000. The AUTHOR.

Map of the Zulu and adjacent Country, compiled from information obtained by Capt. Walmsley, F.R.G.S., the Government Resident Agent. Natal, 1866. Scale 1 inch = 12 miles (geo.).

MS. Chart showing the Temperature of the Currents off the Cape of Good Hope. By Capt. H. Toynbee, F.R.G.S. Scale 1 inch = $3\frac{1}{4}^{\circ}$ equatorial.
The AUTHOR.

Maps, Charts, &c. *Donors.*

AMERICA.

NORTH—

Arctic Regions—

A Chart of the Arctic Regions. Published by the Admiralty, 1859. Framed and varnished. JOHN BARROW, Esq., F.R.G.S.

A Map, in five compartments, showing the Exploration of Smith Sound. By Bylot and Baffin in 1616; Ross in 1818; Inglefield in 1852; Kane in 1853-55; and Hayes in 1860-61. By A. Petermann, Esq. Gotha, 1867. Scale 1 inch = 55·3 miles (geo.). The AUTHOR.

British Columbia and Vancouver Island—

19 Maps of Vancouver Island and British Columbia—

No. 1. MS. Map of Koskeemo Sounds (Vancouver Island), with the Native Names of every portion of the Coasts, Rivers, Inlets, &c., from an Original Survey by the late Arthur Clare, Esq., B.A, C.E. With Annotations by Robert Brown. Original MS. never published. Scale 1 inch = 1 mile.

No. 2. MS. Sketch of the Country between Kayaket Inlets on the Western side of Vancouver Island and the Nimpish River on the Eastern. Copied from the Original Sketch by Lieut. Philip Hankin, R.N., in the Surveyor-General's Office in Victoria, V. I. With Notes by Robert Brown. Scale ½ inch = 1 nautical mile.

No. 3. MS. Map of the Country between Nanaimo Sound and Barclay Sound, V. I., from a reconnaissance by the V. I. Exploring Expedition under the command of Robert Brown in August and September, 1864. Scale 1 inch = 1 mile (geo.).

No. 4. MS. Map of the Central Lake, Kleecoot Lake, Stamps or Moch-hoilth River, and Kleecot River, V. I. From an original Exploration by Robert Brown, June 1863, November 1863, and corrected October 1864. (Original.)

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No. 6. MS. Sketch of Country from Port Augusta to Alberni, V. I., from Exploration by Robert Brown. September and October, 1864.

No. 7. MS. The same as above. More detailed. Original Sketch.

No. 8. MS. Sketch of the Nanaimo River and Lakes, V. I. Drawn from recollection, by Toma Antoine, Iroquois Indian Hunter of the V. I. Exploring Expedition.

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No. 14. MS. Map of the whole of Vancouver Island. Compiled from the Admiralty Surveys of the Coast Line, by Capt. G. H. Richards, R.N. With the addition of Nittinat Inlet, by Robert Brown; the greater portion of the Interior by the first V. I. Exploring Expedition under the command of Robert Brown, 1864; and Mr. Brown's private explorations in 1863, in addition to the reconnaissance by T. Buttle in 1865, Hamilton Moffatt (H.B.C.) in 1852, and Lieuts. Mayne and Hankin,

Maps, Charts, &c. *Donors.*

R.N., 1861. Drawn by John Buttle, under the direction of Robert Brown.

No. 15. Map of the whole of the Southern District of British Columbia. Compiled and printed at the Office of Lands and Works, New Westminster. On 7 sheets. Scale 1 inch = 10 miles (stat.).

No. 16. Map of the Country from Hope to Similkameen and Rock Creek, and Lillooet to Kamloops and Okanagan Lakes, British Columbia. Compiled by the Royal Engineers at New Westminster. Scale 10 miles to 1 inch.

No. 17. Map of British Columbia from New Westminster to Lillooet. By the Royal Engineers. Scale 10 miles to 1 inch.

No. 18. Portion of Vancouver Island and Barclay Sound. By Capt. G. H. Richards, R.N. (Printed at New Westminster, British Columbia, 1861.)

No. 19. Another portion of Vancouver Island and Barclay Sound. By Capt. G. H. Richards, R.N. (Printed at New Westminster, British Columbia, 1861.) Mr. R. W. Brown.

Map of the Gold Regions of the Frazer River and the Washington Territory. By James Wyld. London, 1858. Scale 1 inch = 24 miles (geo.). W. Bollaert, Esq.

United States—

Map of the States and Territories west of the Mississippi River to the Pacific Ocean. By G. W. and C. B. Colton. New York, 1865. Scale 1 inch = 21 miles (geo.).

A New Map of the States of California and Nevada. By Leander Ransom and A. J. Doolittle. 1866. Scale 1 inch = 24 miles (geo.).

Mexico—

Das Kaiserreich Mexico. By E. Ravenstein. 1865. Scale 1 inch = 109½ miles (geo.). The Author.

Central—

Central-America und die Antillen. By E. G. Ravenstein. 1865. Scale 1 inch = 109½ miles (geo.). The Author.

Maps relating to the various proposed Lines for Interoceanic Canals and Railroads between the Waters of the Atlantic and Pacific Oceans. By Admiral C. H. Davis. Washington, 1866. 13 maps, accompanied by a Report. Gideon Welles, Esq., Secretary of the U.S. Navy.

South—

General—

Karte von Süd-America. By E. G. Ravenstein. 1865. On 2 sheets. Scale 1 inch = 109½ miles (geo.). The Author.

Argentine Confederation—

Mapa del Teatro de la Guerra Actuel que comprende toda la Provincia de Corrientes y partes adyacentes del Entrerios, Paraguay, Uruguay, y Brasil. Revisado por D. Francisco Rave. 1865. Scale 1 inch = 17·4 miles (geo.).

arta Geographica de la Provincia de Corrientes y parte de la Republica de Paraguay. Published by the Topographical Department of Buenos Ayres, 1866. Scale 1 inch = 11·4 miles (geo.).

Carta del Entre Rios. Por Nicolas Grondona, Ingeniero. Buenos Ayres, 1862. Scale 1 inch = 11·4 miles (geo.).
T. J. Hutchinson, F.R.G.S., British Consulate, Rosario.

Map showing the Line of the Central Argentine Railway from Rosario de Sante Fé to the City of Cordoba. Plan of the Lands ceded to the Central Argentine Railway by law of May 26th, 1863. Designed by Albano M. de Laberge, C.E. Scale 1 inch = 7 miles (geo.).

Maps, Charts, &c. *Donors.*

SOUTH—

Brazil—

Aufnahme des Oberen S. Francisco und Rio das Velhas (Brasilien), von Emmanuel Liais. Gotha, 1866. Scale 1 inch = 9·9 miles (geo.).
A. PETERMANN, Esq.

Chile—

Mapa de la Provincia de Valdivia segun los datos de la estadistica qe se han podido recoger hasta ahora construida por Capt. Bernardo E. Philippi. 1846. Scale 1 inch = 8 miles (geo.).

Indicaciones para perfeccionar el Mapa de la Provincia de Valdivia segun los recuerdos de un reciente viaje al Volcan de Osorno, por Guillermo Döll. Valdivia, 1852. Scale 1 inch = 4½ miles.

Plano de la Ciudad y Puerto de Valparaiso. Hamburg, 1854. Scale 1 inch = 500 feet.
W. BOLLAERT, Esq.

Peru—

MS. Map of part of the Province of Tarapaca, from Port Conājagua to Ojaica.

Plano de la Ciudad de Lima. Hamburg, 1850.
W. BOLLAERT, Esq.

AUSTRALIA.

Plan showing the track made by J. G. Macdonald from Carpentaria Downs Station (supposed head-waters of Lynd River) to the Albert River, being the result of private enterprise, commenced August 31, ended October 24, 1864. Scale 1 inch = 10 miles (stat.).
Sir G. BOWEN.

Das See'n Gebiet (Lake Distrikt) und die Steinige Wüste (Great Stony Desert) im Innern von Australien. By B. Hassenstein and A. Petermann. Gotha, 1867. Scale 1 inch = 13·8 miles (geo.).
A. PETERMANN, Esq.

NEW ZEALAND.

MIDDLE ISLAND—

Map of the Province of Canterbury, showing the five Routes between the East and West Coasts. MS. By J. Haast, Esq. Scale 1 inch = 10 miles.

Section No. 1. North Rakaia Route; from River Hokitika, on West Coast, by Browning Pass, to River Avon, East Coast.

Section No. 2. Whitcombe Route; from the River Hokitika, on West Coast, by Whitcombe Pass, to River Avon, East Coast.

Section No. 3. Otira Route; from River Arahura, on West Coast, by Arthur Pass, to River Avon on East Coast.

Section No. 4. Hurunui Route; from River Teramakau, on West Coast, by Harper Pass, to River Avon on East Coast.

Section No. 5. Wanaka Route; from River Haast, on West Coast, by Haast Pass, to River Opihi on East Coast.

The above 5 Sections on the scale of 1 inch = 2000 feet vertical, 3 miles horizontal.

A Comparative Diagram, showing Sections of the above Routes from the West to the East Coast; Province of Canterbury, New Zealand, on the same scale as the Sections.

Section from Banks' Peninsula to the Western Slopes of Mount Cook.
J. HAAST, Esq.

Maps, Charts, &c. *Donors.*

Map of the Province of Otago. By J. T. Thomson. Chief Surveyor, and Assistants. Survey Office, Dunedin, Otago, 1866. Scale 1 inch = 13 miles (stat.). The Author.

INDIAN OCEAN.

Chart of the Nicobar Islands. By Commodore Wüllerstorf-Urbair, Austrian frigate *Novara*. 1858.

Chart of the Pearl Banks off Tuticorin and Trichendoor. By C. R. Markham, Esq. Scale 1 inch = 1½ mile. The Author.

PACIFIC OCEAN.

Die Marquesas Inseln. By A. Petermann. Gotha, 1867. Scale 1 inch = 40 miles (geo.). The Author.

CHARTS.

British Admiralty—

Section 1.

No. 34 The Scilly Isles (England, East Coast).
1543 Yarmouth and Lowestoft Roads (England, East Coast).
2750 Skiport Loch (Scotland, West Coast).
2793 Cowes Harbour (Isle of Wight).

Section 3.

No. 2373 Gulf of Riga.

Section 5.

No. 189 Trapani to Marsala (Sicily, West Coast).
203 Santa Maura, Ithaca, and Cephalonia Islands.
211 Bay of Navarin (Greece).
1159 Soussa to Mehediah (Africa, North Coast).
1162 Sphax Roadstead (Coast of Tunis).
1461 Genoa (Italy, West Coast).
1557 Port Argostoli (Ionian Islands).
1609 Santa Maura Roadstead and Port Drepano.
1620 Ports Vathi and Vliko (Ionian Islands).
1676 Gulf of Patras (Greece).
1687 Messina Harbour (Sicily).

Section 6.

No. 259*a* River St. Lawrence (Montreal to Farren Point).
259*b* ,, ,, (Farren Point to Kingston).
343 Lunenburg to Mars Head (Nova Scotia).
1097 Cay Biscayne to Lower Matacumbe Cay (Florida).
1098 Lower Matacumbe Cay to Boca Grande Cay).
2482 Fletcher's Neck to Cape Cod (United States).
2490 Penmaquid Point to Fletcher's Neck (United States).
2860 Port Royal and Calibogue Sounds (South Carolina), U.S.

Section 7.

No. 1 British Isles to the Mediterranean Sea.
1241 Ice Chart of the Southern Hemisphere.

Section 8.

No. 394 Island of Trinidad to Los Roques (West Indies).
446 Jamaica Island (West Indies).
459 Plans of Anchorages in Jamaica.
468 Acul Bay, St. Domingo (West Indies).
481 Serpent's Mouth, Trinidad Island (West Indies).

Maps, Charts, &c. *Donors.*

No. 482 San Fernando Anchorage, Trinidad Island (West Indies).
486 Jamaica, with parts of Cuba and St. Domingo.

Section 9.

No. 1949 The Rocas, Coast of Brazil (South Atlantic).
2522 St. Catharina Island to Rio de la Plata.

Section 10.

No. 538 Seymour Narrows (Vancouver Island).

Section 11.

No. 15 Harbours in the Red Sea, South of Jiddah.
178 Plans of Anchorages on the Coast of Barbary.
638 North bank of the River Congo, &c.
677 East Coast of Madagascar, &c.
686 Fénérive (Madagascar, East Coast).
1223 Kowie River (Africa, South Coast).
2523 Red Sea.

Section 12.

No. 43 Gulf of Kutch (India, West Coast).
50 Katiawar Coast, from Diu Head to Goapnath Point.
51 Gulf of Cambay (India, West Coast).
735 India, West Coast. Sheet 1. Surat Roads to Maruli.
736 ,, ,, ,, 2. Maruli to Arnol Island.
737 ,, ,, ,, 3. Arnol Island to Kundari Island.
738 ,, ,, ,, 4. Kundari Island to Bankot.
739 ,, ,, ,, 5. Boria Pagoda to Achira River.
740 ,, ,, ,, 6. Achira River to Cape Ramas.
744 ,, ,, ,, 7. Cape Ramas to Alvagudda.
745 ,, ,, ,, 8. Alvagudda to Molky.
747 ,, ,, ,, 10. Mount Delly to Calicut.
749 ,, ,, ,, 11. Lat. 9° 50′ to 11° 2′ N.
750 ,, ,, ,, 12. Cundacudvoo to Anjengo.
751 ,, ,, ,, 13. Anjengo to Cape Comorin.
825 Andaman Islands.
2621 Bombay Harbour (India, West Coast).
2736 Gulf of Kutch to Viziadroog (India, West Coast).
2760 Sumatra, West Coast (Sheet 1).

Section 13.

No. 895 Allas Strait (Indian Archipelago).
911 Cajeli, Saparoea, and Amboina Bays.
914 Waygiou Island (Moluccas).
930 Plans of Anchorages in the Moluccas.
947 Victoria Harbour (Labuan Island).
1019 South Coast of Hainan Island (China, South Coast).
1269 Saigon, or Don-nai River (Cochin China).
1963 China, East Coast (Sheet 3).
2454 Northern portion of the Island of Luzon.
2578 Eastern part of the Sulu, or Mindoro Sea.
2640 Java Sea (Western part).

Section 14.

No. 1025 Tacking Point to Coff's Island (Australia, East Coast).
1026 Solitary Islands and adjacent Coast (Australia, East Coast).
2027 Coff's Island to Evans' Head (Australia, East Coast).
1028 Evans' Head to Danger Point (Australia, East Coast).
1068 Moreton Bay to Sandy Cape (Australia, East Coast).

Section 15.

No. 1101 Mariana or Ladrone Islands (North Pacific).
1114 Auckland and Campbell Islands (South Pacific).

Maps, Charts, &c. *Donors.*

1251 Ngau Island and Mumbolithe Reef (Fiji Group).
1380 New Caledonia, New Hebrides, and Loyalty Islands.
1730 Samoan or Navigator Islands (South Pacifie).
The Hydrographic Office,
through Capt. G. H. Richards, R.N., Hydrographer.

MISCELLANEOUS.

Bust of the President, Sir R. I. Murchison, Bart., K.C.B., in marble, by Miss Amelia R. Hill, S.S. Edinburgh, 1866.
Sir R. I. Murchison, K.C.B.

Sketches of the Shevaroy Hills and Pulni Mountains. On 24 sheets. By Lieut.-Col. Douglas Hamilton. London, 1865. The India Office.

A View of the Village at Pitcairn's Island, showing the descendants of the Mutineers of the *Bounty*, as discovered by Capt. F. W. Beechey, in H.M.S. *Blossom*, in 1828. Drawn by W. Smyth, Mate of *Blossom*, Dec. 20, 1828. J. Barrow, Esq., F.R.S.

Photograph of H.M.S. *Bombay*. Vascello Inglese Incendiato nella Riviera della Plata, il 14 Dicb^e^. 1864, con perdita di Q. Uff^li^ é 91 Marinari. Eduardo di Martini, Ufficiale della R. M. I. Dipinsi dal vero Sulla Pyro Corvetta *Ercole*. Capt. F. A. B. Craufurd, R.N.

INSTRUMENTS LENT TO TRAVELLERS.

To the late Mr. I. Duncan, Vice-Consul at Whydah, in 1849—

Telescope.
Two Compasses.
Aneroid Barometer.

Dr. P. C. Sutherland, M.D., F.R.G.S., at Natal—

Brass Sextant (7½-inch), with Silver Arc, by Troughton and Simms.
Strong-framed Artificial Horizon, by Troughton and Simms.
Two Barometers (Mountain), with Improved Iron Cistern, by Newman.

The late Dr. E. I. Irving, M.D., F.R.G.S., at Abeokuta—

Pocket Chronometer, by Barraud and Lund.
Barometer (Mountain), by Troughton and Simms.

Dr. D. Livingstone, M.D., F.R.G.S., Zambesi, Eastern Africa—

Sykes's Hypsometrical Apparatus, No. 1, with Sling Case, by Casella.
Standard Thermometers, 0 to 212, in Brass Cases, „
„ „ in Maroon Cases, „
Artificial Horizon, with Sling Case, „
Prismatic Azimuth Compass, silver ring, with leather Sling Case, „
Rain Gauge.

Dr. D. Walker, M.D., F.R.G.S., Russian America, Dec. 8, 1862—

Sextant, 4 in. radius, by Cary.
Artificial Horizon, Circular, by Cary.
Azimuth Compass, by Elliot.

The late Mons. Jules Gerard, Upper Guinea, towards Timbuktu, Feb. 4, 1863—

Sextant, 3-inch radius, by T. Jones.
Aneroïd, white metal, by Spencer, Browning, and Co.
Artificial Horizon, spirit-level, by Elliot.
Boiling-water Apparatus, and three Thermometers in brass tubes.
Azimuth Compass, by Burnier.
Two small Pocket Compasses.
Protractor, brass, 2-in. radius.
(The above in Leather Case.)
Measuring Tape, 50 feet.
Thermometer, on metal, in Morocco Case.
Protractor, horn, circular.

H. Whitely, Esq., in South Peru, March 28, 1867.—

Pocket Aneroid, No. 89, graduated to 15 inches, by Cary.
Hypsometrical Apparatus, and 3 Boiling-point Thermometers, by Casella.

E. Whymper, Esq., Greenland, Disco Island, &c., February 25, 1867—

Sextant, 6-inch radius, divided to 10″, by Cary.
Artificial Horizon, „
Azimuth Compass and Stand, „
Pocket Aneroid, by Messrs. Beck and Co.
„ Chronometer, No. 835, Brockbank and Atkins.

Rev. F. W. Holland, Sinai, June 25, 1867—

Prismatic Compass and Stand, by Cary.
Pocket Aneroid, graduated to 15 inches, „
Hypsometrical Apparatus, and 3 Thermometers, B.P.
Two Thermometers, divided to 230° for hot springs.
Three Alpine minimum Thermometers.

PRESENTATION

OF THE

ROYAL AWARDS.

(*At the Anniversary Meeting, May* 27, 1867.)

THE Founder's Gold Medal is awarded to Admiral ALEXIS BOUTAKOFF, for being the first to launch and navigate ships in the Sea of Aral,—an achievement which led to the establishment of steam-navigation on that sea and up the great River Jaxartes, into the heart of Turkestan; also for his subsequent successful survey of the chief mouths of the Oxus, in the Khanat of Khiva. The Patron's Gold Medal to Dr. ISAAC I. HAYES, for his memorable expedition in 1860-61 towards the open Polar Sea, wherein he attained a more northern point of land in Smith Sound (81° 35′) than had been reached by any previous navigator.

In presenting the Medals, the PRESIDENT first spoke as follows:—

"IN estimating the advance of geographical knowledge, it is obvious that our allies the Russians have, by their numerous active scientific researches along and beyond their distant frontiers, thrown quite a fresh light upon the physical structure and orography of Central Asia; and in my address of this day I shall dwell upon points relating to this subject which I have not touched upon at former anniversaries.

"It is now my pleasing duty to announce that our Council has selected one of these explorers, that enterprising naval officer, Admiral Alexis Boutakoff, who in the year 1852 transmitted to us a modest account of his survey of the Sea of Aral, as the recipient of our Founder's Medal. That inland sea, though unknown to the ancients, was distinctly recognised by the Arabian geographers, from the year 600, as the Sea of Kwarezm. In the middle and dark ages all knowledge of it was lost to the western world; and it was not until Russia, desirous of an accurate exploration of her Asiatic frontiers, sent, in 1825, an expedition to examine its shores,

under General de Berg, that any real acquaintance with its condition was obtained.

"It was only, however, when ships built at Orenburg were transported in pieces across the wild steppes, that Captain Alexis Boutakoff launched the first flotilla on that sea, and after two years of navigation ascertained its outlines and depth, and the nature of the large islands within it.

"On a recent occasion Admiral Boutakoff has also laid before us a sketch of his able examination of the mouths of the Oxus, where that river empties itself into this inland sea.

"Again, it is still more important to dwell upon the other great services he has rendered to his country and the civilised world, in having proved that the Jaxartes of the ancients (the Syr Daria of the Asiatics), which flows into the northern end of the Sea of Aral, is a stream which steam-vessels can navigate for upwards of 500 miles above its mouth.

"It was by this discovery that a safe line of communication between Europe and China, through Western Turkestan, was first laid open to Europe; so that whilst Britain has had and holds her own high road to India and China by the ocean, Russia, after trading overland for centuries with Western China under great difficulties, owing to the intervention of barbarous and hostile tribes, has at length opened out for herself a course along which, by the interposition of small protective forts, she will have a safe trade through Turkestan with the Celestial Empire.

"Admiring as I do the great progress made by Russians in advancing our knowledge of the geography of Central Asia, I have a peculiar satisfaction in knowing that our Founder's Medal has been decreed to one who is so good a type of those enlightened explorers.

Turning to the Russian officer appointed to receive the medal, the President continued:—"Though unable to be present himself, I rejoice that his place is taken on this occasion by a distinguished brother officer of the Imperial Russian Navy; and I therefore request you, Captain Crown, to convey this medal to Admiral Alexis Boutakoff, as the expression of our admiration of his deeds."

Captain Crown thus replied:—

"Mr. President,—I beg to return thanks to the Royal Geographical Society on behalf of Admiral Boutakoff, for the honour they have conferred on him by awarding him this Founder's Medal. Being myself a member of the Imperial Russian Navy, I cannot but feel proud at having been called upon by you, Mr. President, to

perform the pleasant duty of receiving from your hands this evidence of the high appreciation of Admiral Boutakoff's labours by the Royal Geographical Society, in a region which, even at the present time, is so very little known to the scientific world. The kind approval, which Admiral Boutakoff's works have met at the hands of an Institution so widely known and esteemed in Russia, and of which you are, Sir, the honoured President, will undoubtedly be a source of mutual advantage in the cause of science, and will encourage our Russian geographers to seek a closer acquaintance with your Society, by offering their works in a version more accessible to English scientific readers than the Russian language, so that you will be better able to follow and judge of the progress of geographical researches in Russia, as carried on by your sister institution in St. Petersburg; at the head of which, as you are well aware, is His Imperial Highness the Grand Duke Constantine. I shall lose no time in forwarding to Admiral Boutakoff this Medal, and I only regret that I cannot express his thanks to the Royal Geographical Society, and to you, Sir, in so admirable a manner as he would have done himself, if he were here."

The President next addressed the Hon. C. F. Adams, Minister of the United States, in the following words:—

"Mr. Adams,

Eleven years have elapsed since the Royal Geographical Society did honour to itself by awarding a Gold Medal to your highly distinguished countryman the late Dr. Kane, for his discoveries in the Polar Regions, while in charge of an expedition generously fitted out in the United States to search for Sir John Franklin; and now I rejoice to say that I have to ask you, as the Representative of the great American Republic, to receive the Medal of our Patron, Queen Victoria, which has been decerned to another of your countrymen, Dr. Hayes, for having reached a more northern point of Arctic land (81° 35′) than ever was attained by any previous explorer.

"Forming one of the previous expedition of the lamented Kane, who justly received the applause not only of your country but of the civilised world, Dr. Hayes was on that occasion the discoverer of a large mass of land forming the extreme western shore of Smith Sound, to which the name of Henry Grinnell, an enlightened citizen of New York, the mainspring of that expedition, was most appropriately attached. It is for carrying personal observations to a degree and a half further northward on land than on the previous occasion, and for having sighted the open Polar Sea from the western shore of Kennedy's strait, just as Kane's com-

panion Morton had done from the eastern or Greenland shore of the same, that our Council has most deservedly adjudicated to him our Patron's Medal.

"The scientific results of this expedition have been to a great extent made known in America, and the Smithsonian Institution has undertaken the publication of those important additions to our acquaintance with the natural history, terrestrial magnetism, and meteorology, as well as the geography of the Arctic Regions.

"In the mean time the unpretending volume of our Medallist, entitled the 'Open Polar Sea,' is written in so clear, manly, and attractive a style, as must render it very popular among all readers in the British Isles and America.

"Just as we know that our old Baffin first discovered and navigated in a very small craft the great bay separating Greenland from America, with which his name has ever since been connected, so the extremest point where these waters lead into what was called the 'Open Polar Sea' has been reached by the small American schooner of Dr. Hayes bearing the name of the 'United States.'

"In perusing the narrative of the hair-breadth escapes of this little vessel when beset by huge floating icebergs, the skill with which she was managed, the stern resolution and ability with which every difficulty by sea or by land was overcome, and the rich scientific fruits which were brought back, with the loss only of the able Mr. Sontag, who made most of the astronomical observations, I may well congratulate your Excellency on the success of a voyage which will ever be remembered among the many great exploits of your countrymen.

"I have now only to request you to convey this Victoria Medal to Dr. Hayes, with the request that he will accept it as the strongest proof we can offer of our just appreciation of his great merits."

Mr. Adams replied:—

"Mr. President,—It gives me great pleasure to be the medium of presenting to Dr. Hayes the honourable memorial which your Society has voted to him for his services in the cause of science. It is no part of my province to undertake to vaunt any of my countrymen; but I will say that, in no part of the world will you find more people who watch with greater attention and admiration the brave enterprises for public objects which are undertaken in any part of the world. More especially by their natural connexion, in all the essential elements of civilisation, with this community, their attention is closely drawn to every movement which takes

place here; and following the admiration with which they see what has been done, there grows a desire to emulate the same themselves. It has been often objected to enterprises of this kind, that they can lead to nothing—that they are, in their nature, simply adventures in quest of things that are impossible. But, Mr. President, the same remark might have been made when Columbus first undertook his voyage to the West—to what, he did not know. He thought he might come out somewhere in far Cathay; but the result was, as often happens in life, an unexpected one—and the unexpected turns out to be of greater proportions than anything which had been anticipated. Thus it was that America was discovered, and the influence of that discovery upon the fortunes of the world remains yet to be fully measured. And so it has been with most of the adventures that have been started from the Old World for the discovery of that which was unknown. Very often the explorers do not arrive at what was anticipated; but then they attain to a great deal which was not expected, and which has at the same time proved of very great value. And more than that, and greater than all, this pursuit has led to the cultivation and development of high moral qualities in a class of men, who become themselves greater heroes and greater benefactors to the interests of the world than most conquerors who have been lauded in the pages of history. I therefore, Mr. President, accept this Medal with great pleasure, and I have no doubt that this marked testimony to the merits of one individual will be felt not only by him, but by all that class of individuals, who, at their own cost and expense, carried on his enterprise. It will, moreover, stimulate them to repeat such efforts in emulation of your countrymen, by which the bounds of science may still further be indefinitely extended."

ADDRESS

TO

THE ROYAL GEOGRAPHICAL SOCIETY.

Delivered at the Anniversary Meeting on the 27th May, 1867.

By Sir Roderick Impey Murchison, Bart., K.C.B.,

PRESIDENT.

Gentlemen,

I meet you with the satisfactory announcement that great as was the number of our members at the last anniversary, it has since then considerably increased, and now amounts to 2120 Fellows.

I have also the satisfaction of reminding you that, thanks to the zealous and efficient services of our Assistant Secretary, Mr. Bates, the well-filled volume of the year has been, like the last, for some time in your hands.

The general observations on the progress of Geography which I shall lay before you in the following Address will, as usual, be preceded by brief notices of those of our deceased associates who have taken any part in geographical researches or publications, as well as by a review of the Admiralty Surveys prepared by Capt. Richards, the Hydrographer.

OBITUARY.

In justice to an eminent geographer who has been taken from us, I begin the sad record (much less heavy, however, than that of last year), with a notice of the career of

Sir George Everest.—This distinguished Indian surveyor and geographer was the son of Tristram Everest, Esq., of Gwernvale, Brecon, and was born on the 4th July, 1790. He began his scientific education at Marlow and completed it at Woolwich, where he passed a brilliant examination, and was declared fit for a commission at an earlier age than the limit fixed by the regula-

tions. Sailing for Bengal as an artillery cadet in 1806, the first important service in which he was engaged was in executing a reconnaissance survey of the Island of Java, for which duty he was selected by the famous Sir Stamford Raffles, during the occupation of the island by the British from 1814 to 1816. During this period Everest gained the friendship of our honoured associate Mr. John Crawfurd, who, happily, is still amongst us, after a distinguished career in the East, particularly in connexion with the Malay Archipelago.

On his return to Bengal, Everest was employed by the Government in various engineering works, particularly in the establishment of a telegraph system between Calcutta and Benares. It was not long, however, before he entered upon a service of more immediate connexion with Geographical science; for in 1818 he was appointed chief assistant to Colonel Lambton, the founder of the Great Trigonometrical Survey of India. It will not be considered out of place here, if I mention that this colossal undertaking owes its origin to the late Duke of Wellington, who recommended it and gave it his cordial support, selecting Colonel Lambton to carry it out. How much an accurate survey was needed was shown by the earlier results of the operations, an error of 40 miles being detected in the breadth of the peninsula as previously laid down.

Captain Everest was first employed in the triangulation of the eastern part of the Nizam's dominions, where the unhealthy climate and close application to his duties so affected his health that he was ordered to the Cape of Good Hope to recruit. He did not, however, remain idle, for he employed his leisure in investigating the circumstances appertaining to the Abbé de la Caillé's arc, and his researches formed the subject of a paper, published in the first volume of the 'Transactions of the Astronomical Society.'

On the death of Colonel Lambton, in 1823, Captain Everest succeeded to the vacant post of Superintendent of the great Survey. He applied himself with such unremitting ardour to the extension of the great arc series of measurements, that his health again gave way, and he was obliged to seek rest and change for a time in England.

In 1830 he returned to India, provided, by the liberality of the Court of Directors, with an equipment of geodetical instruments and apparatus for the continuance of the survey, in the construction of which the most skilful makers had been employed. He had made himself acquainted during his visit with the English Ordnance

Survey system, and with every modern improvement in geodetical matters that had taken place in Europe. Thus provided, and in the prime of life, Colonel Everest returned to his great task. In addition to the duties of Superintendent of the Trigonometrical Survey, he had now to perform those of Surveyor-General of India, to which office he had been appointed by the Court of Directors; a union of offices which vastly increased his labours.

Between the years 1832 and 1841 the measurements of the great arc were carried on, and in December of the latter year closed by the completion of the Beder base-line, a work accomplished by his chief assistant, Captain (now Sir Andrew Scott) Waugh. The whole Indian arc from Cape Comorin to the Himalayas was thus completed. These elaborate operations were fully detailed in Colonel Everest's work on the 'Measurement of two Sections of the Meridional Arc of India,' published in two quarto volumes in 1847; a work which gained for its author a high reputation.

In summing up the labours of Sir George Everest I cannot do better than quote the expressive words used when the Asiatic Society of Bengal nominated him an Honorary Member. "Of the many works executed under Colonel Everest's direction, the most important, and that by which he will be best known to posterity, is the northern portion of the great Meridional Arc of India, $11\frac{1}{2}^{\circ}$ in length. No geodetic measure in any part of the world surpasses, or perhaps equals, in accuracy this splendid achievement. By the light it throws on researches into the figure and dimensions of the earth, it forms one of the most valuable contributions to that branch of science which we possess, whilst, at the same time, it constitutes a foundation for the geography of Northern India, the integrity of which must for ever stand unquestioned. Colonel Everest reduced the whole system of the Great Trigonometrical Survey of India to order, and established the fixed basis on which the geography of India now rests."

After Sir George Everest's departure from India in December, 1843, and retirement from the service, his successor, Sir Andrew Scott Waugh, took an opportunity of paying a well-deserved compliment to his former commanding officer, by naming after him the highest mountain measured in the Himalayas—namely, Mount Everest, whose height is 29,002 feet.

At the conclusion of his active career in India, and on settling in England, it was quite natural that all scientific Societies should have wished to do honour to such a man. He therefore naturally became

a Fellow of the Royal Society, an active supporter of the Royal Institution, but especially was he appreciated by Geographers, inasmuch as he was for many years one of our most honoured associates in the Council of this Society, and one of the most distinguished scientific Geographers who ever held the office of Vice-President.

Professor Henry Rogers was a distinguished Geologist of the United States, who for the last years of his life became quite naturalised among us, and was indeed Professor of Natural History in the University of Glasgow at the time of his death.

His chief work, entitled 'The Geology of Pennsylvania, with a General View of the Geology of the United States,' in 3 vols. 4to., was illustrated by so well-defined a map of the whole region of the United States, that even in this Society his name must be ever mentioned with respect.

Besides the delineation of the boundaries of all the principal geological formations in the States, his sections are most ably drawn in showing how the strata of the Apalachian chain have been folded over and over, and how the whole have been violently affected, and in many cases reversed in their order, particularly in contact with igneous and metamorphic rocks of the eastern seaboard.

The Rev. George Cecil Renouard, Rector of Swanscombe, near Rochester, who died on the 15th February last, in his eighty-seventh year, was one of the oldest Fellows of our Society, and during ten years (1836 to 1846) acted most efficiently and zealously as Foreign Secretary. In early life, after leaving Cambridge, he fulfilled the duties of Chaplain to the British Embassy at Constantinople; and, after an interval in England, went back to Turkey as Chaplain to the Factor at Smyrna, which appointment he held to 1814. On returning to Cambridge, he was elected Professor of Arabic in that University. His acquaintance with the geography and languages of the East rendered him a most leading and useful member of the Asiatic and Geographical as also of the Syro-Egyptian and Numismatic Societies.

In regard to his incessant labours to correct and improve all the publications in our volumes which related to Comparative Geography, or to Asiatic and African subjects, I can bear full testimony that this good and learned man laboured successfully for others in the advancement of knowledge, without looking for praise or endeavouring to gain any reputation for himself. As an editor his per-

spicuity was invaluable, as shown by all the papers on classical or critical Geography which passed through his hands.

His kindly manners and true modesty endeared him to every one of the Council with whom he acted, and when he spoke on any moot point, he was as logical in his deductions as he was accurate in his facts.

An excellent parish priest, he united the utmost purity of life with a simple and guileless nature, chastened by a feeling of reverence as deep as it was real; for, disliking metaphysics, he always maintained that Faith has its own high region whither Reason cannot follow it.

Sir Stuart Donaldson, who died on the 11th of January, 1867, was brought up to commercial pursuits, his brother the late Dr. Donaldson, Head Master of the School at Bury St. Edmunds, having been one of the most accomplished scholars of our day. At an early age he went to Mexico, where he remained some years, and acquired a knowledge of the Spanish language, which he spoke with fluency. About the year 1830 he went to Australia, and was engaged at Sydney as a merchant for many years.

On the establishment of Representative Institutions in the colony he became a Member of the Legislature, in which, being a ready and successful speaker, he took a prominent place. When responsible Government was set up in the Australian Colonies (1856) he became Colonial Treasurer, and on his return to England, in 1859, he received the honour of knighthood. Among his good deeds he is to be remembered as one of the original Members of the Senate of the University of Sydney, in the foundation and conduct of which he took, as I am informed by Sir Charles Nicholson, a very important part, as well as in other colonial establishments.

When he came among us here, we who knew him became soon attached to him, for his warm, cheerful, and genial manner; whilst at our convivial parties his fluency and energy as a speaker will be always remembered. In short, both in Australia and at home, this open-hearted, generous man has left many friends to deplore his loss in the prime of life, and when he was striving to obtain a seat in the British Parliament.

It is not within my province to endeavour to do justice to the various claims which many other deceased Fellows have unquestionably had to public recognition, irrespective of geographical science and researches. A mere enumeration, however, of the names of

those who have been taken from us, many of whom were of high reputation in other spheres, will indicate how well the Royal Geographical Society is supported by men of all classes in the British dominions. In this melancholy list are the following:—The Marquis of Camden, K.G., D.C.L., one of our original members; the second Marquis of Lansdowne, son of our much lamented Founder; Lord Northbrook, well known as Sir Francis Baring, M.P., who, when First Lord of the Admiralty, was a good supporter of Arctic exploration and Lady Franklin's efforts; Mr. T. Alcock, formerly M.P.; Mr. Joseph Beldam; Mr. Charles Bathoe; Captain John Chapman, R.A.; Mr. Daniel Clark; Mr. John Dobie, R.N.; Mr. George Dollond; Mr. Peter Dickson; Sir Alexander P. Gordon-Cumming, Bart., of Altyre; Mr. J. Gilchrist; Mr. Charles Pascoe Grenfell, many years M.P.; Mr. Robert Carr Glynn; Major J. F. Napier Hewett; Mr. Jacob Herbert; the Rev. C. Hudson, the ardent Alpine explorer, who lost his life on the Matterhorn; Mr. F. S. Homfray; Mr. R. Hanbury, M.P.; Captain Clement Johnson; Commander Jones-Byrom, R.N.; General Sir Harry Jones, G.C.B., a highly-distinguished officer of Engineers, and lately Governor of the Royal Military College; Mr. C. H. C. Plowden; Mr. Thomas Phinn, Q.C., formerly M.P., and latterly Judge-Advocate of the Fleet, and Councillor of the Board of Admiralty; Major Patrick Stewart, distinguished for his engineering services under Lord Clyde in the Indian war, and also in the laying down of the great telegraphic line through Persia to Hindostan; Mr. J. F. Pike Scrivener; Mr. H. S. Dazley Smith; the Rev. W. Brownrigg Smith, M.A.; Mr. John Stewart; Mr. Alexander Trotter, the brother of the lamented explorer of the Niger; Mr. John Taylor; Mr. Thomas Vardon; Mr. C. Willich; and the Right Hon. John Wynne.

Admiralty Surveys.*—The Admiralty Surveys both at home and abroad have been carried out during the past year with energy and success, and the results compare favourably with those of any preceding year. The following sketch will convey an idea as to how the force has been distributed, and the amount of work which has been accomplished.

Coasts of the United Kingdom.—Captain E. J. Bedford, with his three assistants in the *Lightning*, have been employed in the Bristol Channel. They have completed a new Survey of Cardiff Roads and

* By the Hydrographer, Captain G. H. Richards, R.N.

its approaches on a scale of four inches to the nautical mile, and have done much towards correcting the Chart of the upper portion of the Channel in the vicinity of the Welch Grounds, where great changes had been found to have taken place since the Surveys of 1847-9. This work is still in progress.

Staff-Commander E. K. Calver, with his two assistants in the *Porcupine*, has been employed in making a minute examination of the eastern coasts of the United Kingdom, with a view to correcting the charts and revising the Sailing Directions to meet the constant changes which are occurring on these shores. Five hundred and thirty miles of coast between Cape Wrath, the north-westernmost point of Scotland, and the River Humber, have been so examined, and the entrances of the rivers Tay, Blyth, Tees, and Humber, where very considerable changes were found to have taken place, have been entirely re-surveyed. During the progress of this work a dangerous sunken ledge off Tarbet Ness—the promontory which separates the Dornoch Firth from the Bay of Cromarty—has been discovered and placed on the charts.

Channel Islands.—Staff-Commander John Richards, with one assistant, has completed the coast-line of the Island of Jersey, and has constructed on a large scale a plan of St. Helier's Bay, to enable the island authorities to improve and extend their present limited harbour accommodation.

The exceptionally rocky nature of the shores of the Channel Islands, the many off-lying dangers, the strength of the tides, and the general intricacy of the navigation, render the progress of this important survey necessarily slow, and much remains to be done before we can supply a complete and satisfactory chart of the whole group with their approaches. Surveys of most of the islands, however, are already separately published.

Portsmouth.—A small party with a steam launch has been employed on the Bar, Spithead, and its neighbourhood, during the past year. The deepening of the entrance by artificial means, and the numerous works in progress, have rendered it necessary that a constant watch should be kept to detect the least changes which may possibly take place. Commander Brooker, in conjunction with Mr. Hall, Master R.N., which latter officer succeeded in August last to the charge of the survey, has made a minute examination of the Bar on a scale of 60 inches to the mile; and it is satisfactory to find that the extra depth of between 6 and 7 feet water, which was obtained by dredging two years since, is fully maintained.

Foreign Surveys.— Mediterranean.—The *Hydra*, under Captain Shortland, has been employed during the past season in making a new survey of the Malta Channel, which has involved a minute triangulation of the south and east coasts of Sicily, the accurate determination of the various shoals, with elaborate soundings. This work is still in progress, and it is hoped will be completed during the present year.

China Sea.—This Survey which is under the charge of Mr. J. W. Reed, Master R.N., in the *Rifleman*, extends from the Equator to the parallel of Hong-Kong, including the various passages southward and eastward of Singapore, together with the main and Palawan routes. The whole region is encumbered with innumerable reefs and shoals, and although very much has been done towards determining their true positions, by the many eminent Surveyors who have been for years employed by the Admiralty on this service, no less important to all maritime nations than to Great Britain, much still remains to be completed before we can consider the routes to China free from danger.

Mr. Reed and his officers have been profitably employed during the past year in examining the reefs and shoals in the main route. They have surveyed the St. Esprit Shoal, between the Paracels and Hong-Kong, the Fiery Cross or Investigator Reef off the North-west Coast of Borneo, and determined the true positions, or expunged from the Chart those of many other hitherto doubtful dangers.

North China and Japan.—It was stated in our last Annual Report that the *Swallow*, employed for four years on this Survey, was on her way to England, and was to be relieved by another vessel. The *Sylvia*, under Commander Brooker, has since left England on this duty. The Survey comprises a very extensive field of new, or, at any rate, little known ground, towards which trade is now rapidly advancing.

The labours of the Surveyor have always been, and always must be, the precursor of Commerce; and Japan, Formosa, the Korea—the islands of the Eastern Archipelago—will long afford scope for his energy and talent. The vast Empire of Japan, indeed, has the outline of its shores fairly represented on our Charts upon the authority of its own ingenious geographers, and its principal ports to which we are at present admitted have been surveyed by ourselves; but there is still a void which the annual record of disasters too clearly confirms, and which, if ancient custom is adhered to, it will

remain for us to fill up. As to the Korea, it is at present almost a sealed book.

The *Serpent*, a ship of war under the orders of the Commander-in-Chief in China, commanded by an able surveying officer, Commander Bullock, performs also the duties of an auxiliary surveying vessel when necessary, or the exigencies of the service will admit; and many valuable contributions to the hydrography of the China Seas have been received from Commander Bullock, more especially connected with the coasts of Japan.

Straits of Magellan.—It was also stated in our last report that in withdrawing the second vessel from the Mediterranean Survey now approaching completion, it was the intention of the Admiralty—considering the importance of this Strait as a line of steam communication between the Atlantic and Pacific Oceans, and the comparatively little that was known of those extensive channels leading northwards into the Gulf of Peñas from its western entrance—to undertake a thorough examination of this region. The *Nassau*, commanded by Captain Mayne, sailed accordingly from England on this service in the fall of the past year, and, from our latest information, had commenced her work under favourable circumstances and with the cheerful co-operation of the Chilian Government.

West Indies.—This Survey, which is carried on by hired vessels and boats, has been in abeyance during the last year, owing to the officers who had been many years employed on it having returned to England. It has, however, been resumed under its former commanding officer Mr. Parsons, Master R.N., who, with two assistants, now commence the Surveys of Barbadoes and Montserrat.

Bermuda.—A small surveying party under Mr. Langdon, Master R.N., has been for some time engaged in sounding the various channels between the reefs of this group, the increased draught of water of our ships rendering diving operations occasionally necessary to remove coral patches.

The *Gannet*, a ship of war on the West India Station, commanded by an experienced surveying officer, Commander Chimmo, is also engaged in surveying operations, when other duties will permit. Commander Chimmo has, during the past season, completed the survey of the Gulf of Paria and other portions of the Island of Trinidad, and made large plans of the entrance known as the "Serpent's Mouth," and the anchorage of San Fernando.

The *Gannet*, and gunboat *Minstrel*, under Commander Chimmo,

assisted by Mr. Scarnell, Master R.N., have completed the soundings of the Bay of Fundy, and thus brought to a close the survey of Nova Scotia.

Newfoundland.—This survey, under Mr. J. H. Kerr, Master R.N., and carried on in a hired vessel, has made steady progress during the last year. Mr. Kerr and his assistants also rendered essential service to the expedition which laid the Atlantic cable of 1866, by buoying the course of the cable, and by piloting and assisting with their local knowledge the squadron which assembled in Trinity Bay on that occasion.

British Columbia.—Mr. Pender, Master R.N., in charge of this survey, with two assistants, has been employed during the past year, with a hired vessel, in surveying the intricate and hitherto little known channels between the north end of Vancouver Island and the northern boundary of the British possessions, in 54° 40′ N. lat., and has made good progress with this work; he has also surveyed the bar and harbour at the eastern entrance of the Skiddegate Channel in Queen Charlotte Island, as well as made plans of several useful anchorages, not before known, on the shore of the mainland. The bar at the entrance of the Fraser River has also been re-surveyed, in consequence of material changes which had occurred in the depth and direction of the channel.

Cape of Good Hope.—The survey of the shores of this Colony has rapidly advanced towards completion under Staff-Commander Stanton, during the past year; and, with the assistance of H.M.S. *Rapid*, Commander Stubbs, afforded him by Commodore Caldwell, the soundings between Storm River and Cape Reciffe have been satisfactorily completed.

Colonial Surveys.—*Victoria*.—Captain Cox having retired from the charge of this survey, after a long and useful service of more than thirty years in the surveying branch of the profession, has been succeeded by Commander Wilkinson, who, with his assistants during the past year, has made considerable progress in the survey of the exposed outer coast of this part of Australia—having completed from Port Phillip westward to within a league of Cape Otway. The Government of Victoria have wisely placed the Colonial steamer *Victoria* at Commander Wilkinson's disposal for this duty during the last few months, the advantage of which over the former system of working in a small sailing-vessel is apparent in the increased progress of the survey; and should it be found practicable to continue this advantage to the surveying officers, we may expect at no distant

time to have the whole seaboard of this colony completely and satisfactorily surveyed.

New South Wales.—Captain Sidney, in charge of this survey, has, with his two assistants, made very good progress during the past year. The coast between Sydney and Port Stephens, a distance of 86 miles, has been very carefully examined and charted. A resurvey of the harbour of Newcastle, rendered necessary by the changes in the banks and channels, has also been made, and the harbour of Port Stephens has likewise been completed.

Queensland.—The progress of the regular survey of the coasts of this colony has been somewhat interrupted, owing to changes among the officers; Staff-Commander Jeffery has retired from the charge of the survey, and his assistant been transferred to another colony. Mr. Bedwell, Master R.N., has succeeded to the charge, and without any assistant has completed 60 miles of the shores of Moreton Bay, and sounded over 180 square miles of ground.

Any loss of time, however, which has been sustained through the causes above named has been more than compensated for by the energy and ability of Commander Nares, of the *Salamander*, who, while employed on special service between Brisbane and the new settlement of Somerset at Cape York, has lost no opportunity of adding to our hydrographical knowledge of those parts of the Eastern coast of Australia which had only been partially examined before; and since our last report Commander Nares has surveyed the eastern coast of Hinchinbroke Island, the Palm Island Group, and Cleveland Bay.

The examination of the southern and eastern shores of the Gulf of Carpentaria by the *Salamander* was postponed during the last season, from press of other duties; but it has probably been carried out ere this.

South Australia.—The little vessel employed on the survey of the coast of South Australia had, as stated in our last year's report, been transferred for a very considerable time, at the request of the Colonial Government, to the north and north-western coasts of Australia in connection with the formation of new settlements. Latterly Mr. Howard, Master R.N., who was in charge, together with his assistant, Mr. Guy, have been able to add considerably to our knowledge of these shores, and have charted the coast between Cape Croker, the north-east point of Coburg Peninsula and Cape Stewart, a distance of 250 miles. All this coast has been fairly sounded and several new dangers accurately determined and laid down, as well as detailed

plans made of Mountnorris Bay and the Liverpool River. The vessel has now returned to Adelaide, and Commander Hutchison, having resumed the charge of the survey, has commenced his work on the eastern side of Spencer Gulf, 70 miles of the coast of which, southward of Cape Elizabeth, including a plan of Port Victoria, have been already completed.

Summary.—During the year 1866 sixty-eight new charts have been engraved and published, noteworthy among which is that showing the Agulhas Bank and the coast of the Cape of Good Hope from Hondeklip Bay to Port Natal. Upwards of 1050 original plates have been added to and corrected, and 168,900 charts printed.

Sailing Directions for the approaches to the China Sea and Singapore, by the Straits of Sunda, Banka, Gaspar, Carimata, Rhio, Varella, Durian, and Singapore, as well as the annual light books, tide tables, and azimuth tables, have been published.

Continental Publications.—Independently of the Societies established in many of the capitals of Europe for the promotion of Geographical Science, the chief source of information has been, as in former years, Perthes' 'Geographische Mittheilungen,' so ably conducted by our Honorary Associate, Dr. A. Petermann. Although the past year appears not to have been remarkable for any great discoveries in our science, many memoirs of considerable interest have been published in this important serial. Amongst those more especially deserving of mention is an article entitled 'Das Nordlichste Land der Erde' (1867, Part v.), which contains a *resumé* of the geographical and cartographical results of all the North Polar Expeditions in the neighbourhood of Baffin's Bay from 1616 to the last journey of our Medallist, Dr. Hayes, in 1861. The paper is illustrated by an excellent comparative map, which gives a clear view of the successive additions to our knowledge of this portion of the Arctic regions. A memoir by the well-known Siberian explorer and naturalist M. Radde, is also well worthy of especial mention, describing the chief results of his travels and botanical researches in the Caucasus in the year 1865. This, together with a memoir by Otto Finsch, 'On the Geographical Distribution of Parrots' ('Mittheilungen,' 1867, Part i.), illustrated by a map, coloured to show the ranges of the genera and families, furnish striking examples of the close connection of botanical and zoological distribution with our favourite science. Other papers worthy of attention are, Payer's 'Investigation of the Ortler Alps;' Colonel E. von Sydow's

View of European Cartography in 1865 and 1866; an article by the learned Editor, advocating warmly the establishment of a German Society for the promotion of geographical expeditions; and, lastly, 'Altitude measurements of the Rocky Mountains in Colorado Territory,' in which it is shown that Pike's Peak and other culminating points are exceeded in height by peaks in the Sierra Nevada range of California, as measured by the Geological Survey of that State.

Grundemann's Missionary Atlas.—A special Atlas devoted to the illustration of the Geography of Protestant Missions, and compiled by Dr. Grundemann, is now in course of publication, in German and English editions. The first parts, containing maps of several districts on the West Coast of Africa, have already appeared, and the work seems likely to prove very useful to all those who are interested in the progress of missions in little-known parts of the world, especially as the maps contain much detail and are in a convenient and portable form.

Africa.—*Dr. Livingstone.*—During the last few months our thoughts have been directed, with painful interest, to the last enterprise of our eminent associate, Livingstone. For reasons which I have explained at our evening meetings, and also through the public press, I have never admitted that there existed any valid proof whatever of the death of that great traveller. And now that Arab traders have arrived from a spot close to the reported scene of the murder, long after the event was said to have taken place, and brought to the Sultan of Zanzibar the intelligence that he had passed safely into the friendly Babisa country to the westward, and that a report has arrived at Zanzibar that a white man had reached the Lake Tanganyika, we have fresh grounds for hoping that he may now be pursuing his journey in the interior. In truth, we have recently obtained good evidence of the mendacity of the man Moosa, on whose statement alone the death was reported—it being known that he has given one version of it to the Consul and Dr. Kirk at Zanzibar, and also to the British resident at Johanna, and an entirely different one to the Sepoy examined, on his return to Bombay, by Colonel Rigby. We have, therefore, the strongest grounds for disbelieving the story altogether, and for hoping that our great traveller has passed safely through the intermediate country and reached the Lake Tanganyika, the great object of his mission.

Already Livingstone, by crossing the northern end of his own

Lake Nyassa, has determined one important point in respect to the watershed of South Africa, for he has proved, according to Dr. Kirk, that this great sheet of water here terminates, and is not connected with the more northerly Lake Tanganyika. If he has been spared, as we all hope, he has before him as grand a career as was ever laid out before an African explorer, it being now probable that Tanganyika, a fresh-water sea which must have an outlet, is connected on the north with the Albert Nyanza of Baker and others belong to the Nile system. For although Burton and Speke estimated the height of Lake Tanganyika to be little more than 1800 feet above the sea—the Albert, or lower lake being, according to Baker, 2720 feet—many persons, mistrusting the results obtained by the use of a bad thermometer, still think it probable that the Tanganyika may communicate through a gorge in the mountains at its northern end with the Albert Nyanza of Baker; for both these waters lie in the same meridian.

Pursuing this subject, our associate Mr. Findlay, after a comparison of the altitude observations of Burton and Speke, on the first East African expedition, those of Speke and Grant on the second, and of Baker on his great journey to the Albert Nyanza, has prepared a memoir in which he endeavours to prove that these various altitudes are not inconsistent with Tanganyika being the furthermost lake of the Nile system, with an exit into Albert Nyanza. This important argumentative memoir will be read to us at our first meeting after the Anniversary.

For myself, I give no opinion on a question which, like many others respecting African geography, can really be decided by positive survey only. Let us, then, trust that Livingstone has been enabled to solve this singularly interesting problem.

In the mean time, not believing in the death of Livingstone on the sole testimony of one of his cowardly baggage-bearers who fled, and who has already given different versions of the catastrophe, I am sure the Society and the public will approve of the course I recommended, and in which I was cordially supported by the Council, and, to their great credit, by Her Majesty's Government, namely, to send out a boat expedition to the head of Lake Nyassa, and thus ascertain the truth. If by this exhaustive search we ascertain that, sceptical as we are, the noble fellow did fall at that spot where the Johanna man said he was killed, why then, alas! at our next anniversary, it will be the sad duty of your President, in mourning for his loss, to dwell upon the wondrous

achievements of his life. If, on the contrary, we should learn from our own envoys, and not merely from Arab traders, that he has passed on into the interior (and this we shall ascertain in six or seven months), why then, trusting to the skill and indomitable pluck of Livingstone, we may feel assured that, among friendly Negro tribes, who know that he is their steadfast friend, he may still realize one of the grandest geographical triumphs of our era, the connexion of the great Tanganyika with the waters of the Nile system.

But even here I would have my countrymen who are accustomed to obtain rapid intelligence of distant travellers not to despair if they should be a year or more without any news of our undaunted friend. For, if he be alive, they must recollect that he has with him a small band only of faithful negroes, no one of whom could be spared to traverse the wide regions between Lake Tanganyika and the coast. Until he himself reappears—and how long was he unheard of in his first great traverse of Southern Africa!—we have, therefore, little chance of knowing the true result of his mission. But if, as I fervently pray, he should return to us, with what open arms will the country receive him! and how rejoiced will your President be, if he lives, to preside over as grand a Livingstone festival as he did when this noble and lion-hearted traveller was about to depart on his second great expedition.

The party which I have announced as about to proceed to Eastern Africa, to procure accurate information concerning Livingstone, will be commanded by Mr. E. D. Young, who did excellent service in the former Zambesi expedition, in the management of the *Lady Nyassa* river-boat. With him will be associated Mr. Henry Faulkner, a young volunteer of great promise, and two acclimatised men, one a mechanic and the other a seaman. The expedition, I am happy to say, is warmly supported by Her Majesty's Government, and the building of the boat is rapidly progressing under the orders of the Board of Admiralty. The boat will be a sailing one, made of steel, and built in pieces, no one of which will weigh more than 50 lbs., so that the portage of the whole by natives past the cataracts of the Shiré will be much facilitated. The Government have arranged for the transport of the party to the Cape, with the boat and stores, by the African mail-steamer on the 9th of next month.*

* To the credit of the Union Steam Packet Company the boat has been taken out free of charge. Whilst these pages are passing through the press, I learn that the party sailed from Plymouth on the 11th instant.—*June* 12, 1867.

Arrived there, one of our cruisers will take them to the Luabo mouth of the Zambesi, where the boat will be put together, and the party—having engaged a crew of negroes—will be left to pursue their noble and adventurous errand, by the Zambesi and the Shiré, to the head of the Lake Nyassa. On account of the heavy seas which prevail on the western or leeward side of that lake, the expedition will keep close to its eastward shore, hitherto unexplored, and it is expected it will reach Kampunda, at the northern extremity, by the end of October, and there ascertain whether our great traveller has perished as reported, or has passed forward in safety through Cazembe to the Lake Tanganyika.

Senegal.—In former Addresses I have had occasion to record the great services rendered to Geography by the enlightened Governor of the French possessions on the Senegal, Colonel Faidherbe, who has greatly extended our knowledge of the country along the banks of that river. The most advanced post of the French is Medine, near the cataracts of Felou, 600 miles from the mouth, up to which point the river is navigable, during the rainy months, for vessels drawing 12 feet of water. With a view to ascertaining the political condition of the countries beyond the eastern frontier, as also to fix accurately the geographical positions of places between the Upper Senegal and the Niger, an expedition was sent out by Colonel Faidherbe, in 1863, to traverse the distance between Medine and the important town of Segou, which had been visited by our own renowned traveller Mungo Park, sixty years previously. The mission was most ably and successfully carried out by Lieutenant E. Mage and Dr. Quintin of the French navy. Countries recently desolated by semi-religious wars carried on by Mussulman chiefs were traversed with great danger, and the positions of the route carefully laid down; the road taken being a *détour* to the north, after crossing the Senegal, by Diangounté, to Yamina, on the Niger, and thence by canoe to Segou. By this journey Lieutenant Mage has filled up a void in all maps of the region of the Upper Senegal, and corrected the positions of many places as previously laid down by Mungo Park and others; but the accuracy of our English traveller in the most important points is cheerfully acknowledged by his accomplished French successor, especially, for instance, in the position of Yamina, which Mungo Park fixed at 13° 15′, and Lieutenant Mage found to be 13° 17′ N. lat. The expedition returned to the mouth of the Senegal in June, 1866, and the

French Geographical Society in the present year has rewarded the courageous leader with one of its gold medals.

Asia.—Whilst, with the exception of the probable settlement of the north end of Lake Nyassa by the last journey of Livingstone, little has been added in the past year to our stock of knowledge respecting Africa, much information has in the same period been elicited regarding the geography of Central Asia, particularly as respects the physical features of those vast northern portions of it which have been explored by the Russians, and the positions of places and mountain ranges laid down by our own surveyors to the north of British India.

At the head of the labours which have elucidated the comparative geography of this quarter of the globe, I place the two remarkable volumes produced by our distinguished associate Colonel Henry Yule, c.b., entitled 'Cathay and the Way Thither,' published by our active auxiliaries the members of the Hakluyt Society, and of whose productions our Secretary Mr. Clements Markham is the perspicuous editor. Although the student of the former condition of China and the surrounding regions has ever dwelt with profit and delight on the descriptions of the great traveller Marco Polo, as first brought under the notice of modern English readers by Marsden, and as since rendered so popular by the excellent work of M. Pauthier, it was left for Colonel Yule vastly to extend our acquaintance with the amount of information possessed by our ancestors in the mediæval centuries which succeeded to the epoch when the great Venetian lived. By gathering together in one collection various records of other travellers in the East, commencing with those of the quaint and original Friar Odoric of Pordenone, in the fourteenth century, Colonel Yule has not only satisfied the cravings of scholars, but has at the same time gratified geographers by the preparation of a most instructive map of Asia, such as it was when explored by those earlier travellers, and when it was ruled over by the different branches of the family of Chinghiz Khan.

The contrast between the statistical and political condition of Asia, particularly its central portion, in those days when mercantile men traversed it freely from Azof or from Tabriz to India and China, and the present time, when there exists so small an amount of land intercourse with Europe, is truly astonishing. In those days, and even as late as the sixteenth century, Samarkand, a city renowned as a

seat of Mohammedan learning, was frequented by embassies, including one from the King of Spain. Even our own Queen Elizabeth was so anxious in the first year of her reign to open out an intercourse by way of the Caspian with Persia and India, that she addressed a letter to "the Great Sophi, Emperor of the Medes and Parthians." It was then (1558) that Jenkinson, our English traveller, made the journey from Astrachan to Bokhara, passing by Urghendj.

Now, with the exception of Russia, whose mission in 1841 has been noticed in previous addresses, no European power has had any sort of intercourse with the truculent Emir of Bokhara, to whom much of this fine region is, alas! subjected. It has since been left to stray travellers, one of the last of whom is the enterprising Hungarian Vámbéry, to explain to the civilized world the real state of this region, once so important, and now so fallen through tyranny and misgovernment. No one can have read that author's sketch of the condition of the natives in either of the Khannats of Khiva or Bokhara without rejoicing that Russia has, through the energy of her Government, at last brought these barbarians to respect the frontiers of an empire which has established a safe line of communication between its own territories and those of China.

One of the most important statistical results of modern geographical research, and the employment of natural means to a great end, is the bringing into real use, for the first time in history, the River Jaxartes of the ancients (now called the Syr Daria), and navigating it with steamers from its mouth on the Sea of Aral for many hundred miles into Turkistan and Kokand. By this great feat, and by the erection of forts, Russia has established an entirely new and well-protected route between Europe and China, far to the north of that followed by travellers and merchants in the middle ages, which was from the south end of the Caspian.

England, holding as she does so high a maritime position among the nations, may reflect with satisfaction on her great eastern traffic with India and China, carried on by her own great road, the ocean; and, far from envying the recent opening out of this land and river route through Central Asia, she may be well pleased that her Northern allies should have a beneficial commercial traffic by caravans with those fertile regions of north-western China, with which, in fact, we never have had any intercourse, but with whom the Russians have traded for ages, though always until now with more or less impediment, due to the forays of the intermediate wild people, and particularly the Kokandians. The two great empires

of Russia and China seem, in fact, to be destined by nature to interchange commodities by land and river communications through Central Asia; and so long as the line of such commerce between them is separated, as it now is, from British India and its dependencies by mountainous, sterile, and snowy regions, impassable by modern armies, there never can be the smallest ground of jealousy on the part of Britain.

On this head I was much gratified, at our very last meeting, in listening to the able memoir of Captain Sherard Osborn on the actual state of Chinese Tartary, an enormous region that has become, through the relaxation of the Chinese hold, "no man's land," and in hearing from the eloquent author, as well as from the commentators on his Memoir, that, instead of any apprehension being entertained regarding the late Russian advances, it was generally felt that it would be greatly to the advantage of the natives, as well as to British power in India, that the influence of a civilized Christian nation should be extended eastward over a region now becoming desolate through misgovernment and lawlessness.*

These considerations lead me naturally to say a few words upon the geographical operations of our medallist Admiral Boutakoff, which have mainly led to the establishment of the new Russian line of eastern traffic, and which have justly obtained for him a high reputation. The first of these enterprises might almost be called the geographical discovery of the Aral Sea. For, although this great mass of salt water had been known to Arabian geographers during several centuries under the name of the Sea of Khwarezm, though its shores had been visited by travellers, one of whom was the accomplished Russian geographer George von Meyendorf, who described the mouths of the Syr Daria or Jaxartes, at its north-eastern extremity, and another, General Berg,† who led a Russian expedition along its western banks in the winter of 1825-6, no ship had ever sailed upon this inland sea. The first vessel launched upon it was constructed at Orenburg in 1848, and transported in pieces across the desert, and in it Boutakoff, after two years of navigation,

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* The reader who wishes to become acquainted with the physical features and boundaries of the districts of Chinese Tartary, so well expounded by Capt. Sherard Osborn, and of which he prepared a large map, must consult Keith Johnston's Library Map of Asia, published by Mr. Stanford, in the preparation of which Mr. Trelawney Saunders took a leading part.

† See the first published notice of the remarkable expedition of General Berg in 1825, in the work of myself and coadjutors, 'Russia and the Ural Mountains,' vol. i. p. 310. General Berg is now Count de Berg, and the Emperor's representative in Russian Poland.

defined the real shape of the coast, established the depths of the sea, and was the discoverer of the large island in it, the wild antelopes of which came to stare with astonishment, yet without fear, at their first invaders.

Fifteen years have elapsed since I communicated the first important paper of Boutakoff to this Society, and it was spoken of with all the praise it merited in my Anniversary Address of the year 1853.* The successful exploration of the Jaxartes, and the discovery of its fitness for steam navigation, which was the next exploit of Boutakoff, led to the establishment of the great central route to China already mentioned, and Russia naturally availed herself of the commercial advantages thus presented in these natural features near the boundaries of her Asiatic possessions.

The question now arises, whether, by these enterprises, the honour does not truly belong to Russia of having, for the first time in history, defined the course of the Syr Daria and its exit into the Sea of Aral? The classical writers were, as I shall presently show, ignorant of the true geography of this region, particularly of its northern part, and an attentive consideration of its geological structure and physical outlines has led me, followed by the inquiries I have made among comparative geographers who have well studied the subject, to believe that their silence with respect to the Aral Sea is no proof that it has not existed during the whole of the historical era.

Holding this opinion, I necessarily differ from my friend Sir H. Rawlinson, who, in observations recently delivered from the chair of this Society † made a very ingenious statement, and gave it as his opinion that there was sufficient evidence to show that in early times, say from 600 years before the Christian era to 500 or 600 years after it, both the river Oxus and Jaxartes flowed into the Caspian, the Aral being non-existent. That afterwards, and up to the year 1300, they fell into the Aral, and that for the next two hundred years (1300 to 1500) they came back into the Caspian, subsequently flowing gradually back into the Aral and forming the Sea as we now know it.

Although I know that my colleague will admit that my geological data must have some weight, I have to claim his indulgence for venturing to question the views of so eminent a scholar respect-

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* 'Journal,' vol. xxiii., President's Address, p. lxxxvi.
† See 'Proceedings,' 11th March, 1867.

ing the changes of physical features in this region that may have happened in the days of history. Supported, however, as I am by the opinions of men on whose knowledge I place great reliance, I must say that I cannot regard the Persian manuscript, which was presented to Sir Henry by a clever chief of Herat, to be a document of sufficient value to override the conclusions at which I have arrived on many independent grounds.

Concerning the ancient course of the Oxus, I see no reason to differ from the Persian writer and Sir Henry. But when it is stated that in the year A.D. 1417 the Jaxartes had deviated from its former course, and instead of flowing into the Caspian (as the ancients had it), joined the Oxus, and thus, the two rivers occupying one and the same bed, came into that sea, I must withhold my assent. This is a novel and striking statement, and before we attach credence to it we must have some physical evidence to sustain it. In my state of scepticism regarding the value of this Persian manuscript, now for the first time produced, that which strikes me *à priori* as a sign of its invalidity, is, that when this region was open to knowledge through the long-enduring reign of the civilised and literary Arabians (say from the 7th to the 13th century), the Aral was known and laid down as a distinct water-basin under the name of Sea of Khwarezm. On the other hand, when after that period knowledge became dim and local, and civilisation was at its lowest ebb, then it was that the Aral disappeared. My conclusion from this coincidence of the supposed emptying of the Aral, with the absence of records respecting it, would be that the sea had existed during all that time, but that there were then no geographers to record the fact.

In treating this subject, let us first consider the separation of the Aral from the Caspian as originally dependent on geological changes of the surface, and then proceed to estimate the value we are to attach to the writings of the classical authorities in reference to a region so very imperfectly known to them. As a geologist who has studied this Aralo-Caspian question *in situ* I beg to place on record in our Geographical volumes my view of the prehistoric physical outlines of a region which, with the exception of the obliteration of one mouth of the Oxus, has, I venture to think, undergone no essential change during the human period.

According to all good authorities, including Humboldt, there existed in the latest tertiary, or what some call quaternary times, a vast depression on the surface of the globe, extending over 8,000

square marine leagues, in which a great inland sea was accumulated, and which, in a work on Russia, my associates and myself first mapped out under Humboldt's name of Aralo-Caspian.* In that sea there lived an abundance of molluscous and other animals, all of species having a local and limited range, and all strikingly distinguished from the more numerous animals of oceanic seas. Now, owing to the upheaval of large portions of the bottom of that old inland sea, its animal contents formed, in a fossil state, the Steppe limestone, as seen at different levels over an enormous area. Owing to these prehistoric movements of the crust of the earth, these fossil remains are seen to occupy the strata on the banks of the lake of Aral, as well as on the shores of the Caspian Sea. They also occur at various places and at different heights in the adjacent Steppes, extending westward to the country of the Don Cossacks to the north of the Sea of Azof, where I have myself examined them. There is therefore no doubt that, in prehistoric times, the Aral and the Caspian, and also portions of a much wider region, now raised above them, were occupied by one vast internal and depressed sea, large portions of which have been desiccated. By these movements of elevation that part of the former great sea which became the Aral was elevated to about 117 ft. above the former western part, or present Caspian, and the seas thus insulated were separated through the same movements by the elevated plateau now called Ust-Urt.

This was the physical condition of the region long before tradition or history. Humboldt has well remarked that the great Aralo-Caspian depression had a similar origin to the much deeper cavity in the earth's surface occupied by the Dead Sea, though the one is only 83 feet and the other nearly 1300 feet beneath the Ocean. Now, if we endeavour to account theoretically for the low present level of the old Aralo-Caspian Sea by evaporation only, we are met by the facts that large portions of its former bottom have been raised to different altitudes in the surrounding region, and that the levels of the Sea of Aral and the Caspian are also different, and are separated by the great plateau of Ust-Urt. As it is impossible to explain the existence of the much deeper cavity of the Dead Sea except by a greater sinking of the earth's crust, so is such a phenomenon precisely what geologists would expect to see realized

* See 'Russia in Europe and the Ural Mountains,' vol. i. pp. 303-314, and particularly observe the map and section, p. 311, from the Sea of Azof across the Caspian and the Ust-Urt to the Sea of Aral.

as a natural and compensating result of the corresponding upheaval of the adjacent lofty mountains of Asia.

This being the conclusion at which geologists have arrived, let us see if it be interfered with by any reliable historical records. As to the knowledge possessed by Alexander, or his cotemporaries, it really does not touch the question of the relative courses of the Oxus and Jaxartes towards their mouths. For Alexander crossed the Oxus at about 400 miles above its mouth, and the most western point at which the great conqueror reached the Jaxartes was Cyropolis, where he passed it to defeat the Scythians; and that spot is about equidistant from the Aral Sea. Consequently, neither Alexander nor his generals could know anything of the real course of either river for great distances above their mouths. Scholars and comparative geographers doubt, indeed, if any weight can be attached to the unanimous statement of the Greeks, that both the Oxus and Jaxartes flowed into the Caspian, by mouths some 300 miles apart,* when they see how equally unanimous were the writers who came between Herodotus and Ptolemy in believing the Caspian to be but a gulf of the Northern Ocean! Again, we see how persistently the followers of Alexander confounded the Jaxartes itself with the Tanais, and fancied that they had doubled back upon the rear of Europe.

"The expedition of Alexander," says Humboldt, "far from extending or rectifying the geography of the Caspian Sea, confounded the Tanais with the Jaxartes, and the Caucasus with the Paropamisus or Hindu Kush." † Again, "It is through a singular combination of circumstances that the great Macedonian expedition, which in other respects extended the geographical horizon of the Western nations, became fatal to the geography of the Caspian Sea." ‡ Further on, he says, "Some traces of the Sea of Aral, described as a great basin to the east of the Ural or Jaik River, are indeed found in Menander, the Byzantine historiographer; but it is only with the series of Arabian geographers, at the head of whom, in the tenth century, we must place El-Istachry, that we first obtain a certain knowledge of the topography of these countries." §

The truth is, that, when it was thus loosely said, that both the Oxus and Jaxartes flowed into the Caspian, we must make due allowance for the ignorance of the ancients of the northern portion

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* 2400 stadia according to Eratosthenes, and 80 parasangs according to Patroclus, both quoted by Strabo.

† 'Asie Centrale,' vol. ii. p. 14. ‡ Ibid., p. 153. § Ibid., p. 156.

of this vast region, particularly of the course of the Jaxartes, which no one of them had fully explored, and at the mouth of which none of them had arrived.

If, indeed, we rely on the sagacious Rennell, he, in his great work on the 'Geographical System of Herodotus,' may be said to have established this point, for, in speaking of the old geographers, he says, "they understood the *Aral to be included in the Caspian*, since they knew but of one expanse of water in that quarter; for the Cyrus and Araxes, Oxus and Jaxartes, were all supposed to fall into the same sea." This he contrasts with the accurate subsequent knowledge of the Arabian geographers. And truly so, for this was the regular progress of observation, and a great advance over the ignorance of the classical writers respecting these hyperborean tracts. In those times the regions inhabited by the Massagetæ and the King of Kharasmia (the present Khiva) were barbarous countries, never explored by geographers; and, consequently, the classical authorities could only have obtained the little knowledge they possessed from native hearsay.

In his able essay on the 'Life of Alexander the Great,' Williams distinctly lays down, in his map of that period, the seas of the Aral and Caspian as distinct bodies of water. The same separation is given by Rennell, in his map of the twenty satrapies of Darius Hystaspes; and, whilst in it he indicates the Oxus flowing into the Caspian, and the Jaxartes into the Aral, he shows completely how the two seas were separated by what he terms the high plateau of Samob, the Ust-Urt of the present day.

Again, Thirlwall, in his 'History of Greece,' plainly leads us to believe that the Greeks could have known nothing of the region of the Sea of Aral and the mouth of the Jaxartes, except what they derived from the reports of the King of Kharasmia, who came from a distance in the north to visit Alexander. In short, there is no historical evidence whatever to oppose the view, that the outline and structure of the Aralo-Caspian region, as now seen, was determined, as I have said, long anterior to the historical era.

On the point of the prehistoric separation of the Aral from the Caspian, I entirely concur with Humboldt. "If we ascend," he says, "to the primitive condition of the vast Mediterranean concavity, I should be led to believe that, notwithstanding the diminution of surface which the Caspian and Aral basins may have undergone in the historical times, from Hecatæus and Herodotus down to the tenth century of our era—*i. e.* to the days of

the Arab geographers El-Istachry and Ebn Haukal—the event of the separation of the Aral and Caspian remounts to a geological epoch, which, like the separation of the Euxine and the Caspian, or the opening out of the Dardanelles and the Straits of Gibraltar, are all ante-historical, or far beyond any human tradition." *

In sustaining this view it is to be remarked that, whilst the Aral Sea trends from north to south, the Syr Daria and its embranchment the Kuvan Daria, which flow into it from the east, have had courses at right angles to that sea itself; thus favouring the geological view that the great movement which produced the plateau of the Ust-Urt, separated the Sea of Aral from the Caspian, and left the chasm occupied by the Aral, was also accompanied (as is usual in such elevations) by transverse flanking openings in the mainland, on the east, along which those rivers flowed. In this view the parallelism of the Syr Daria to that of the Kuvan Daria, about 50 miles south of it, is remarkable.

If the Jaxartes ever flowed to the south-west, as suggested by Sir H. Rawlinson, it must have joined the Oxus long before the united streams fell into the Caspian, which is very distant from the nearest point of the valley of the Oxus. But if such an union of the great streams ever existed in so southern a latitude, it must have been perfectly well known to the ancients, and they have made no allusion to it. On the contrary, they believed and have stated, that the rivers fell independently into the Caspian, and by different courses, separated from each other by a wide interval.

Whilst I think that, probably, the many-mouthed Oxus always sent a large portion of its waters into the Aral, I also quite believe that one of the branches debouched formerly into the Caspian, as explained by Humboldt, and as proved indeed by the old English traveller Jenkinson, to whom he refers. It will also be presently seen that the distinguished Asiatic geographer Semenof would explain the desiccation of the former or Caspian branch of the Oxus in another manner. The stoppage of that watercourse (formerly an usual line of traffic) may also be accounted for by a local elevation of land in that latitude; for it is not remote from the scene of igneous eruptions that produced volcanic mountains, as the greater and lesser Balkan, near the ancient desiccated mouth of the Oxus. Such a change of level may, indeed, have been caused by the same subterranean

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* Humboldt, 'Asie Centrale,' vol. ii. p. 146.

forces which, in this latitude, evolve, at the present day, the fires of Baku, and have recently thrown up volcanic mud-islands near the southern end of the Caspian. The elevating effect of these forces would deflect the Caspian branch of the Oxus and cause its waters to unite with the branches which flowed northwards into the Aral Sea.

The great distinction between the views taken by Sir Henry Rawlinson and myself is, that whilst I believe the main outlines of the Aralo-Caspian region were determined by movements of the earth in quaternary or later tertiary times, he refers the great changes which he believes to have been made in the courses of the Oxus and Jaxartes to no very distant historical dates; thus referring the emptying and refilling of the deep hollow in which the Aral Sea lies to comparatively modern times.

He offers, indeed, one argument, which, if sustained, would at once dispose of my view. In support of the opinion that the Aral Sea was non-existent in the thirteenth and fourteenth centuries, he states that in those days travellers from Europe to Asia passed over dry lands since occupied by that sea. If this were substantiated, the belief I have adopted that the separation of the Aral from the Caspian, and the upheaval of the broad intervening plateau of the Ust-Urt, would be at once removed from a prehistoric period to the days of Henry III. and the two first Edwards of English history.

Now, surely, if so great a terrestrial change of surface as this had happened in the thirteenth or fourteenth centuries, the rumour of it would have been bruited throughout Europe and Asia. Unwilling, however, to rest upon any notions of my own, I have consulted that admirable comparative geographer, Colonel Yule, as to the routes taken by the mediæval travellers of that date; and he having favoured me with much information respecting the whole of this subject, I extract from his letter the appended long note.* By reference to it the reader will see that no foundation for such an assertion is to be traced in the narratives of these old travellers. For even when the starting point of their journey eastward lay upon the Volga, their line of march is traced either quite to the south of the Aral through the lands of modern Khiva, or more to the north of that sea, and probably beyond sight even of its shores.

* After alluding to the little weight to be attached to the statements of the Greeks, tracing the imperfect accounts of Herodotus and his followers, and rejecting the Oxiana Palus of Ptolemy, which had been made "to do duty," as he says, for the Aral on many respectable maps, Colonel Yule proceeds to say:—

"We are on surer ground in the narrative of the Embassy of Zemarchus to the Khan of

In considering what changes have or may have occurred within the historic period, and quite independent of all former or geo-

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the Turks about the year 570. The remains of the historian Menander, which relate this mission, are unfortunately but fragments, and do not say how Zemarchus got from Byzantium to Central Asia. But on his return route, which lay to the north of the Caspian, we are told that before reaching the rivers *Ich* and *Daich* (apparently the modern Emba and Ural) [1] he passed for twelve days along the sandy margin of a certain *great and wide lagoon*. This looks very like the Aral; nor probably will Sir Henry Rawlinson deny its existence at that date. But I quote the allusion to show that even the Greeks, once they got actually to the site of the Aral, did recognise its existence.

"We now get to a period regarding which there is no controversy. A long *catena* of geographical works, as Sir Henry Rawlinson tells us, represents the two great rivers as falling into the Sea of Khwarezm, *i. e.* the Aral. But is it the case that this chain of testimony ceases with the year 1300? Among those quoted by Humboldt even are some of later date, such as Abulfeda and the Persian Hamdallah. It is the case, no doubt, that those Eastern geographers often copy what has been said by their predecessors centuries before; but a passage which Humboldt quotes from Hamdalla, a writer of the 14th century, appears to be original. It speaks of the Sea of Khwarezm (or Aral) as having a compass of 100 parasangs, and separated from the Caspian by a tract of 100 parasangs in width. It contains also the remarkable statement that only a *part* of the water of the Oxus then flowed into the said sea, which was fed also by the River of Ferghana (the Jaxartes) and others.

"Two centuries later, when the first English traveller [2] reaches those regions, he finds the Aral in existence, though his account of it is but hazy; and when Russian geography springs up at the end of the 16th century, we find that it already knows the Aral well as the Blue Sea.[3]

"Knowing then, as we do, how many indications point to the existence in those regions in recent geological times of a great inland sea, and finding a tolerable chain of evidence as to the Aral itself—either positive or implicit—down to the days of modern geography, I feel it difficult to believe, on the authority of the Persian MS., that this great sea, nearly 600 miles in circuit, with precipitous sides and attaining a depth of 37 fathoms, did, for a number of years, entirely cease to exist, and then again became as we see it and as old Arab geographers had described it. I by no means desire to dispute that there may have been a material contraction of its area at the time when a considerable part, if not the main stream, of the Oxus flowed into the Caspian; but this is a different thing from its entire disappearance and desiccation.

"There is one argument on this subject urged by Sir Henry Rawlinson which I think a review of the facts in detail will scarcely bear out. He refers to that period during the 13th and 14th centuries when the vast extent of the Mongol domination threw open Asia, which for a succession of years was penetrated by envoys, missionaries, and adventurers, several of whose narratives have come down to us, and when a regular course of trade was established, regarding which we have many particulars.[4] The route usually followed by those travellers, Sir Henry says, lay exactly across the site of the Sea of Aral; yet not one of them mentions it. If this were so indeed, it would be vain to maintain the *improbability* of what would be so clearly established as a fact.

"But let us glance at the routes followed by these travellers successively from the first of them in the middle of the 13th century. This was Friar John of Plano Carpini, sent on a mission from the Pope to the Great Khan in 1245-47. Friar John, though he

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[1] "Perhaps, however, the *Ural* and *Ik*, so carrying the route north of Orenburg."

[2] "Jenkinson."

[3] "See in Levchine's 'Description des Hordes et des Steppes des Khirghiz Kazaks,' in his dissertation on the Jaxartes, p. 462, a quotation from a Russian geographical work of the time named."

[4] "Surely there is a *lapsus*, when Sir Henry Rawlinson speaks of these merchants as returning with the *tea* and silk of China; or, if he has grounds for including the former, it would be most interesting that they should be produced. In 'Cathay,' I have indicated the mention of tea by Ramusio's Persian friend Hajji Mahomed, as the first known to me in any European book."

logical changes, I necessarily attach great weight to the opinion I have recently obtained through my friend General Helmersen from

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writes in the main like a man of sense and reading, is not a good geographer. He makes the Dnieper, the Don, the Wolga, and the Jaic all fall into the *Great Sea*, the '*Mare Magnum*, which has its issue by St. George's Channel at Constantinople;' and rides for many days along the shores of the Caspian, apparently under the impression that it is but a part of the Euxine.[1] We might ask, in passing, if there were no Friar Johns among the ancients capable of the more venial error of confounding the Sea of Aral with the Caspian? Be this as it may, there is no reason for carrying the route of Carpini's party over the bed of the Aral. After crossing the Jaic, it lay for many days through the land of the *Cangitæ*, or Kankhlis, in which they found few people, but very many and large salt-marshes and lagoons, which they took to be the *Paludes Mœotides* of the ancients, and which probably were those which still exist to the north and north-east of the Aral.[2] They then enter the land of the *Bisermini*, or Mussulmans, and come upon the cities and cultivated lands of northern Turkestan.

"Friar William de Rubruquis, eight years later, is more correct in his notions of geography. He clearly discriminates the Caspian from the Euxine, and gives a fair account of it. He gives also the general orientation of his route, running due east from the Wolga for 45 days and then turning southward, and so continuing for eight days till he reached *Kenchak*, a city known to have been in the valley of the river Talas. If you protract this route as well as the data will admit, you will find that it entirely clears the Aral.[3]

"Another traveller, who visited the Court of Mongolia in the same year with Rubruquis, was King Hethum or Hayton, of Little Armenia. He, too, after visiting Batu Khan upon the Wolga, rides eastward across the Jaic; but, as he passes the Irtish also, his route must have lain far to the north of the Aral. On his return he passed by Samarkand and Bokhara into Persia.

"Marco Polo himself never mentions the Aral, indeed; but neither does he mention the Jaxartes, and seems never to have been nearer either than at Kashgar. In the preliminary chapters of his book, in which he speaks of the journey made by his father and uncle from the Wolga to Bokhara, he unfortunately gives no particulars of their route,[4] excepting that they went south from Bolghar to Ukak (near Saratov) before striking east.[5]

"Probably, however, it was the same as that laid down in the next century from the information of the merchants who had travelled it, by the Florentine factor Balducci Pegolotti, about 1330-1340. This route, followed by mercantile travellers bound for China, ran from Sarai, on the Wolga, to Saracanco, or Saraichik, on the Jaic, and thence in camel-waggons to Urghanj, the capital of Khwarezm, which stood on a branch of the Oxus, about 60 miles south of the present embouchure of that river in the Aral Sea. From Urghanj the travellers were in the habit of proceeding to Otrar, a few miles north of the Jaxartes, and not far from the modern town of Turkestan, and so forward to Almalik, near the Ili, the capital of the Khanate of Chagatai. They thus travelled distinctly *round* and not across the bed of the Aral. We are told, indeed, that if they had no merchandise to dispose of at Urghanj, they might save from 5 to 10 days by going direct from Saraichik to Otrar. If we lay down this direct route with geometrical and literal directness, it will indeed pass through the extreme north of the Sea of Aral. But even direct railway lines are not so straight as that; and there can be little doubt that Pegolotti's direct line was much the same as that followed by Carpini and Rubruquis in the preceding century.

"The same route that Pegolotti recommends—viz., that from Sarai to Saraichik, and

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[1] "See in D'Avezac's edition, p. 743."

[2] "See the narrative of Carpini's companion, Benedict the Pole, in D'Avezac, p. 777."

[3] "For a detailed examination of Friar William's route see 'Cathay and the Way Thither,' p. ccxi. *seqq.*"

[4] "The *Tigeri*, or Tigris River, which Polo mentions as crossed by the party, was supposed by Marsden and his successors to be the Jaxartes; but Pauthier has clearly shown it to be the Wolga. (See his 'Polo,' p. 8; also 'Cathay,' p. 234.)"

[5] Timur, invading Kipchak and Russia, went so far north as to cross the Tobol before crossing the Jaic.

M. P. Semenof, the President of the Physico-Geographical section of the Russian Geographical Society, who has distinguished himself by his researches in the Thian Shan chain of Central Asia. Whilst he rejects, like myself, the hypothesis of the great Aral depression having been emptied and refilled in the historical period, he refers the desiccation of the Asiatic rivers and the diminution of lakes to the decrease of glaciers in the high mountains, as well as to great evaporation. By these causes he thinks that at one period the Aral Sea may have been diminished, though he is firmly of opinion that such a deep depression could not have been emptied and refilled. In reference, however, to the former Caspian branch of the Oxus, in the existence of which he believes, he supposes that many streams, now dry or nearly so, formerly

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thence to Urghanj and Almalik—was followed by Friar Pascal, of Vittoria, in 1337,[1] and (as far as Urghanj) by Ibn Batuta, a few years earlier, in travelling from Sarai to Bokhara.

"It was probably also the route followed by John de' Marignolli, on his journey towards Peking, in 1339-42; but, unfortunately, he says nothing whatever of his route between the two Mongol capitals of Sarai and Almalik.

"We have named all the travellers, as far as I am aware, that have left any record of their journeys in those regions during the period to which Sir Henry referred. None of them, we must acknowledge, say anything of the Aral Sea; but we see also that it cannot be maintained that they gave the practical disproof of its existence which would be afforded by their travelling dryshod across its bed! and the travellers' narratives were the bases of the maps to which Sir Henry has referred. The Catalan map does not, indeed, contain the Sea of Aral; but neither does it contain any hint of the Jaxartes. The great map of Fra Mauro, though it contains no Aral, represents the river Amu (or Oxus) as flowing into the Lake Issik-kul, which is, perhaps, an adumbration of some knowledge of its discharge into another sea than the Caspian. The traditions of geographers are hard to correct. I do not know what map first shows the Aral under anything like its proper conditions. Many years after the date of the Russian geography to which we have alluded as so clearly indicating the Aral under the name of the Blue Sea, we find John Blaeu, in his great atlas (1663), representing the Jaxartes as flowing into the Caspian, and a duplicate of the same river, under the name of *Sur*, flowing by Tashkend into the 'Lake of Kathay,' with a difference of 30 degrees of longitude between the two! Even Petis de la Croix, in the maps (sometimes singularly happy) which illustrate his translation of the History of Timur, has no indication of the Aral.

"There is, indeed, one mediæval map which at first sight seems to bear strong testimony to the existence of the Aral Sea in the beginning of the 14th century. I mean that curious one executed by the old Venetian Marino Sanudo, and submitted by him to the Pope and King of France, about 1325, with his grand scheme for the destruction of the Mohammedan power. This map exhibits very clearly a *Mare Yrcanum*, *Caspis* or *de Sara*, in the proper position of the Caspian. It is connected by a river with another sea, further east, marked *Mare Caspium*, and full of islands, which is in a startling degree suggestive of the Aral. Further still to the east, towards *Sera*, appears a third and smaller sea, without a name, into which the *Gyon* flows (*i. e.* Jihun or Oxus). I dare not, however, lay much stress on this map, which contains almost nothing else to corroborate a claim to exacter information. The multiplied seas *may* have sprung only out of some misunderstanding of the classical geographers."[2]

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[1] "'Cathay,' p. 232."

[2] "The map is engraved in 'Bongarsius, Gesta Dei per Francos,' vol. ii. There is a *quasi* facsimile of it in the second volume of Vincent; but in this latter the third sea is scarcely to be recognised."

augmented the volume of the Oxus, thus enabling it to supply a branch to the Caspian by the Gulf of Karabogas, and that to the failure of this supply we may attribute the drying up of the branch, without involving any great physical change of outline of the land. In this case the Aral Sea, occupying a separate cavity not communicating with the larger depression, would, as he thinks, become shallower, and to a great extent obscured by reeds, so as to have remained unknown to travellers for 500 years before and 500 years after Christ. M. Semenof suggests that in those days when the South-western branch of the Oxus existed, travellers proceeding northwards and meeting with little but reeds and marshes, might very well suppose that the Aral was merely an extension of the great Bay of Karabogas of the Caspian Sea. In illustration of this view he informs me that the inhabitants around the lakes Ala Kul and Sassyk-Kul have at this day no precise conception of their separation, and term them both Ala Kul simply, because they are unacquainted with the marshy and inaccessible isthmus between them. In Central Asia, too, the River Tchu, through its desiccation, has lost its former communication with the Lake Issyk-Kul, just as in the Aralo-Caspian region the Sary-su River has failed to reach the Syr Daria; and this last river, having lost its northern affluents, could no longer contribute (if ever it did) by any of its branches to the Oxus, and has found an easier embouchure in the Aral. How easily these changes of direction are effected in the course of rivers in flat and sandy countries, is well known to many Russian geographers who have explored Central Asia.

Thus, the Oxus, deprived of many of its former affluents, ceased to be able to throw any portion of its waters into the Caspian, and took the straight course into the Aral. This natural operation, as Semenof observes, may have also been accomplished within the historical period, and so, since its South-western or Caspian branch dried up, the Oxus, by throwing all, instead of a part, of its waters into the Aral, has given to that sea a better-marked place in human knowledge than it had in the fourteenth and fifteenth centuries.

Before I quit the subject of the now desiccated former branch of the Oxus, I may state, on the authority of my correspondent, General Helmersen, that recently a memoir was presented to the Imperial Geographical Society of St. Petersburg, suggesting that men of science should be sent to the spot to examine into the evidences of that ancient bed of the river, and also to test, by soundings along the shore of the Caspian, if any remains of the

old delta of that stream could be detected. But the project, as well as the continuation of the survey and soundings of the southern edges of the Caspian, have both been suspended, I believe from motives of economy. The latter important work was under the able direction of Captains Ivanchnizow and Oulsky, who had already proceeded so far that in less than three years they would have completed the survey of the whole of that vast interior sea; and it is indeed much to be regretted that a work of such great geographical interest should have been thus set aside.

In conclusion, my belief is:—1. That the Caspian and Aral have existed as separate seas before and during all the historic period. 2. That the main course of the Rivers Jaxartes and Oxus, as also of the sites of the Caspian and Aral seas, were determined in a prehistoric period. 3. That at one time the Oxus emptied itself both into the Caspian and the Aral, and that the Caspian branch-stream was sent back to the course of the other portion of the stream, either by the local rise of some lands between Khiva and the Caspian, or by desiccation and a want of sufficient power of water. And, lastly, that the Jaxartes never was deflected from its natural east to west course, to pass southwards, and so reach the Caspian by the southern end of the great elevation of the Ust-Urt, after a very long course at right angles to its present direction, to say nothing of its having in that case necessarily united with the Oxus by the way—a fact, of which, as already stated, all history is silent.

If old authors believed, without personal observation, that the Jaxartes, as well as the Oxus, fell independently into what they called the Caspian, we may easily account for such a notion, at a time when the true meridian of barbarous places lying to the north of any line of intercourse between Greece or Rome and Asia was wholly undetermined. May we not rationally infer that the ancient geographers believed that the Jaxartes, as well as the Oxus, flowed into the Caspian, simply, as suggested by Rennell, from having heard that the Jaxartes terminated in one great sea, and that they naturally believed that the Aral was then simply the north-eastern portion of those large inland waters of which they had heard, but of which they knew nothing accurately.

In truth, when we know that the geography of the Greeks, and even of the Romans, was worthless, in regard to any lands beyond the parallel of the mouth of the Oxus, we necessarily recur to the works of the earliest Arabian geographers, in which the Sea of Khwarezm was first exhibited as a separate sea. As such it also appears in

the maps of Rennell, of Williams, of Yule, and, in short, of all the best authorities, representing that which I believe to have been the true physical condition of the region during all historical time, and which I maintain dated from an ante-historical period.

In estimating the present or future relative importance of the Oxus and Jaxartes as lines of commercial traffic with China and India, I have no hesitation in saying that the latter river holds the first place. By reference to the memoir of Lieut. Wood, in the tenth volume of our 'Journal', describing the sources of the Oxus, and still better by inspecting the map of the Bolor Mountains and Upper Sources of the Oxus, which has just appeared in our present volume (vol. 36), I agree with the able Russian geographer Veniukof, who, after alluding to the wild barbarian races which occupy the high tableland of Pamir and the adjacent mountains, adds this significant passage: "When we, moreover, remember that this basin of the sources of the Oxus is closed in on the north, east, and south by mountains from 15,000 to 18,000 feet high, and across which the roads for pack-animals are few and difficult to traverse, we must arrive at the conclusion, that all idea of converting this region into a rich entrepôt for a trade with India and China must be abandoned." *

Before I quit the subject of the investigation of Central Asia, let me ask those of my countrymen who read German with facility, to peruse the great work of Ritter, the 'Erdkunde von Asien:' and they will at once learn how to value the vast amount of modern discovery which is due to our Russian cotemporaries.

On former occasions I have naturally adverted to several of these remarkable researches; but I regret that, in my last two Addresses, I have omitted to notice, as I now do with special approbation, the memoir of M. Semenof, published in our Thirty-fifth Volume, on 'Djungaria and the Celestial Mountains.' As the only man of modern times who has explored a considerable portion of the Thian-Shan or Celestial Range, M. Semenof must be placed among the most distinguished of the famous band of Russian explorers—not simply for having determined many geographical positions, the forms of the land and their altitudes, but also for his careful examination of the mineral character of the rocks which constitute the loftiest masses of those regions. In so doing, he has set aside one of the few errors which the illustrious Humboldt fell into in his grand generalizations, when he was led to believe that the Thian-Shan—

* 'Journal,' vol. xxxvi. p. 263.

the great axial range of Central Asia—must be essentially one of volcanic eruption.

Influenced, doubtless, by his successful description of the Andes of South America, and the rise to their summits of active volcanoes, the great traveller was very naturally disposed to apply the same inference to the lofty chains of Central Asia; the more so as all the imperfect data he could collect seemed to indicate the existence of rocks of that class.

But as soon as the Thian-Shan was examined by the only man of science in our age who has visited it, he found nothing but sedimentary strata; and as this important rectification is due to M. Semenof alone, we must not only accord to him all due praise as a Geographer, but it is specially my duty as a Geologist to thank him for making this great observation.

In fact, the grand movements of upheaval, which determined the form of many of the loftiest mountains, whether in Central Asia or in the great northern barrier of India, the Himalayas, were caused by former expansions from the interior, doubtless due to central heat, which raised up sea-bottoms, often altering them into crystallised rocks, and elevating them to enormous altitudes, without exhibiting any true igneous rocks.

Having already twice alluded to the recent discoveries in Asia by the Russians, and we having endeavoured to do honour to them by the award of our Founder's Medal to one of the most distinguished Russian explorers, it is now my pleasing duty to advert to others of their recent labours in that quarter of the globe.

On former occasions I have dwelt upon the explorations of Eastern Siberia and the affluents of the grand River Amur and the mountains to the north. Let us now turn to Central Asia proper, and see what good documents have been furnished by the different men of science who have explored those regions. I gather from the bulletins of the Imperial Geographical Society that the communications of MM. Semenof, Severtzof, Poltarazky, Abramof, Bakkof, Goloubef, and Printz, explain the physical conformation of tracts and the natural riches of regions never before reached in modern times.

Of most of these hitherto unknown and wild tracts the Russian explorers have prepared or are preparing maps. To facilitate journeys from Siberia to Pekin, Dr. Brettschneider, the physician to the Russian mission in China, has laid down upon a map all the different known roads across Mongolia, of which that which

is called the post road is 1760 versts long, between Kiachta and Pekin, with 68 relays. If the telegraph, which one of our countrymen, Mr. Gordon, who had travelled across this desert, sought to realize, be established, the journey across the desert of Gobi will soon be thought nothing of.

As to Bokhara, of which Englishmen have only painful recollections, on account of the murder of our distinguished officers, Conolly and Stoddart, we now know that two Russians, MM. Gloukovsky and Tatarinof, who were for seven months captives there, have added much knowledge to that acquired by their accomplished countrymen Khanikoff and Lehmann in 1842.

Those of our associates who may now visit St. Petersburg may see pictorial views of Khodjend, Tashkend, and all the places taken from the Kokandians in the recent advance of the Russians along the Syr Daria, and now forming parts of the great new province of Turkestan. I learn also, in reference to this region, so recently opened out to the civilized world, that M. Struve, the son of the great Russian astronomer, has prepared a map of the whole province of Turkestan, on a scale of 40 versts to the inch.

Deeply interested as we must all be in this grand opening out to geographers of a vast unknown country, my first request to my eminent friend Admiral Count Lütke must be, that as President of the Imperial Geographical Society and also of the Imperial Academy, he will procure for our Society copies of the maps which, to their great credit, the Russian geographers have prepared.

Northern Frontiers of British India.—At our last anniversary it was my duty to dwell upon the great accession to geographical knowledge obtained by the survey of Captain Montgomerie in the mountainous region north of Cashmir and the Himalayas Proper. I have now to remind you of the highly interesting journey made by Mr. W. H. Johnson, from Leh, in Ladakh, to Ilchi, in Chinese Turkestan, a city which had not been reached in this century by any European since the days of Marco Polo and the Mediæval travellers, except by Adolf Schlagintweit, who was killed. This town lies further northward than any point reached by his brothers when they traversed the Kuen Lun.

The clear and eloquent manner in which this great feat on the part of an Indian engineer, brought up under Sir Andrew Waugh, was laid before the Society by Sir Henry Rawlinson, renders all comment on my part superfluous. For he not only delineated the

achievement of that traveller, but put you completely into possession of all the historical data relating to this vast and little-known region, the routes used in old times for traffic, and pointed out to you how it happened that Ilchi, once a great mart on the highway between Russia and China, had been left aside on account of the more favourable route by Yarkand. Although I have always discouraged discussions on the political interests of our own country in reference to those of other nations, I entirely agree with the observation which fell from Sir Henry Rawlinson, that both the Russians and ourselves might trade advantageously with that great intermediate region, and that at the chief cities of each, consuls of either nation might live together in perfect amity.

When that state of things shall have arrived, our geographers would no longer be wanderers, stealthily seeking to acquire knowledge, but would be associated with Russian topographers in defining the physical features of wide tracts, which, though useful to both countries for trade, are far too vast to be objects of settlement for either.

The mineral products of this region are, no doubt, as numerous and important as Sir Henry Rawlinson described them to be, particularly in gold and jade, and the opening up of a fresh trade might be highly beneficial to ourselves and to Russia, now that the Chinese domination has been entirely set aside.

Tibet.—The survey of Lake Pangkong in Tibet, by that intelligent and active explorer, Captain Godwin Austen, is another fact of marked interest in the delineation of tracts lying to the north of the frontiers of British India. Passing from Leh over the Chang La Pass, 17,470 feet above the sea, this traveller, like Dr. Thomson in other adjacent tracts, encountered the most enormous accumulation of débris which had been swept down from the Snowy Mountains, occasionally barring up the streams. He followed the great lake to within a short distance of Noh, a Tibetan town of the province of Rudok. Although the Lake Pangkong has now an altitude of 13,931 feet above the sea-level, Captain Austen showed, judging from traces of remains of shells at considerable altitudes, that its waters must once have stood at a much higher level. At that remote period the waters were fresh and the country covered with rich vegetation; but now the waters of the lake are much too salt to nourish any molluscous animals, and its banks are entirely destitute of vegetation.

Site for a New Indian Capital.—At one of our evening meetings in

January a valuable paper by the Honourable George Campbell, a Judge of the newly-instituted Supreme Court of Judicature for the Bengal Provinces, was read and discussed. The subject was an enquiry into the most suitable site for a new capital for our Indian empire, there being a pretty general agreement in the condemnation of the present metropolis. Had it been possible to foresee the present extent of our dominion, it is almost certain that Calcutta would not have been our choice. It is situated at a corner of our dominion, all the most valuable portions of it lying north, south, and west of it, sometimes at distances of 1000 or 1500 miles. It lies in the delta of a great river, almost on the Tropic. The result of this locality is that the climate is unsuited to the constitutions of the denizens of a cold and temperate region, one-third part of the year only being congenial, while the remainder is divided between great heat and drought and great heat and moisture. In such a climate Europeans cannot labour out-of-doors without imminent peril to health, and the consequence is that most Englishmen, from the Governor-General downwards, abandon Calcutta, if they can, for two-thirds of the year. Still, as the port of the mighty Ganges, Calcutta is truly a metropolis. Although at first a village, it was the seat of our commercial factory; and Bengal, to which it belongs, was our first profitable acquisition—that acquisition, indeed, which, in the sequel, enabled us to make and maintain future territories.

The desirable points to be held in view in the selection of a second capital for India are, that the locality should be central, that the climate should be so temperate that the ruling class should be able to labour effectively without detriment to health, and that the locality should be secure from the dangers of foreign and domestic aggression. There are, no doubt, other qualities which it would be convenient to combine with these, but which are probably nowhere attainable. It would, for example, be desirable that the capital should be situated in a fertile and productive territory, capable of sustaining a large population, but such a position could only be found in the low and hot valleys of the great rivers. It would perhaps be desirable that the seat of government should, at the same time, be a great commercial emporium; but this advantage cannot be combined with the more indispensable requisite of a temperate climate, since all the possible commercial emporia of India are tropical, and on the sea-level. It would be desirable that the Government of India should have the benefit of a public opinion at its

seat; but this does not seem to be indispensable, for with the rapid communication which exists in our times, and which has been extended even to India, the public opinion of great provincial towns may be as effective as that of any capital.

Even centrality of position has, by the discoveries of steam navigation, the railway, and the telegraph, become of far less importance than it once was. The same discoveries have contributed to diminish greatly the risks of domestic insurrection, and as to danger from a foreign enemy, our substantial protection is not local, but rests on England, and the pre-eminence of England's navy.

The author of the paper points out the neighbourhood of a town called Nassick as the most suitable site for a new capital of India. Nassick is an inconsiderable Mahratta town, and a famous place of Hindoo pilgrimage. It has a fertile territory, is but 120 miles from Bombay, and on the line of one of the great railways; but then it is two degrees within the Tropic, and but 2000 feet above the sea-level, so that its summer heat cannot but be very considerable. Nassick did not receive the general approval of the able and expeperienced Indian officers* who discussed the question at our meeting. Some of the speakers expressed a favourable opinion of the Neilgherry Hills, a mountain range which covers an area of 600 square miles, and already the seat of several *sanataria*, and which contains several extensive plateaux, which rise from 5000 to 7000 feet above the sea-level, with a reduction of temperature corresponding to these altitudes, and not unlike the climate of an English summer, although lying between the 10th and 11th degrees of latitude.

Delta of the Indus.—In the course of the session, a paper of eminent ability on the Physical Geography of the Lower Indus, was read by Colonel Tremenheere. It gave rise to a spirited discussion on a disputed question of engineering; but as engineering is not a special branch of geography, we, according to our usual practice, offered no opinion of our own. Exclusive of all theory, however, the subject of Colonel Tremenheere's communication, which includes in a direct line to the sea, 330 miles of the lower course of the Indus, and, incidentally, the harbour of Kurrachee, the only navigable entrance to the Indus, is of unquestionable importance.

The Indus, with its harbour, Kurrachee, I may observe, is to Western India what the Ganges and Calcutta are to Eastern India.

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* For the various opinions expressed by Sir Henry Rawlinson, Sir Charles Trevelyan, Sir Robert Montgomerie, Sir Erskine Perry, and others, *see* 'Proceedings,' vol. xi. p. 74.

No doubt the Indus and its affluents, passing as they do through a comparatively sterile and under-peopled region, are of far less value to agriculture than the Ganges with its affluents, which water the most extensive, fertile, and populous parts of India; yet it has its special advantages. For vessels of burden its navigable course is more extensive; it is our natural frontier at the only quarter from which our Indian dominion can be assailed, while it is the great highway to the possible points of attack. The port of Kurrachee has even some advantages over that of Calcutta. The navigable difficulties incurred in reaching it from the open sea extend only about 10 miles, while in the case of Calcutta they extend over 150. Kurrachee has, besides, the advantage of being from 2000 to 3000 miles nearer to England—the true source of our Indian wealth and power—than Calcutta. Kurrachee was, like Calcutta, a small village when we took possession of it only 24 years ago. It is now a considerable, well-built town, and its importance as a commercial emporium may be judged by the following simple fact. Its joint export and import trade in 1844 was of the value of 122,160*l.*, and on the average of the four years ending with 1866, it amounted to 5,500,000*l.*

Independent of the political and commercial advantages of the Indus, with its harbour, it is not to be forgotten that Kurrachee is the only port existing on the western side of India, with the exception of the fine one of Bombay. India, meaning by this the proper country of the Hindus, is, for a great, populous, and wealthy region, singularly deficient in good harbours. On its eastern side it has not one until we arrive at the head of the Bay of Bengal, where we find Calcutta, made tolerably safe, only by dint of great skill and heavy cost. It is worth notice, in a geographical sense, that the opposite coast of the same gulf forms, in this respect, a singular contrast, for here we have no fewer than four good and safe harbours, Negrais, Rangoon, Martaban, and Mergui, the three first being also the embouchures of navigable rivers. If we include Penang, which is on the same coast, we have five harbours, while large and populous Hindustan has but three.

Kurdistan.—In the mountainous region immediately to the north of the plains of Mesopotamia, and around the sources of the Tigris and Euphrates, our Consul at Diarbekr, Mr. I. E. Taylor, has been doing good work of late years in advancing geographical and archæological knowledge. In a former session of our Society, Mr. Taylor communicated to us the results of his researches during the

years 1861-3, when he explored the eastern head of the Tigris, verifying the description of Strabo, and discovering near it a record of an invasion of the country by one of the Assyrian monarchs. Returning, in 1865, to the scene of his labours, after a short visit to England, this persevering explorer has continued his researches in the direction of the Kara Su River, or Lycus of the ancients. He has lately sent us a brief preliminary account of this last journey, stating that he has traced this river to its sources and discovered the site of Pompey's Nicopolis. A more detailed account of these explorations, together with a map of his routes over districts never before visited by a European in modern times, is promised by Mr. Taylor, and will doubtless form the subject of discussion at one of our evening meetings early in the next session.

Egypt.—*The Great Pyramid.*—Among recent publications, I must not omit to notice Professor Piazzi Smyth's 'Life and Work at the Great Pyramid.' If our Government of late years has seemed too often chargeable with indifference to the promotion of scientific research in foreign regions, and even in its own dominions, there are still private Englishmen ready to devote their time and means to such researches. And as it is to the labours and munificence of one Englishman (Colonel Howard Vyse) that Europe owes all the most important discoveries regarding the general structure of the Great Pyramid, so now to the indefatigable work of another we owe the most minute and scientifically accurate measurement of its details that has ever been executed.

Before his visit to Egypt, Professor Smyth had become an enthusiastic advocate of the late John Taylor's theory of the Pyramid as a great metrologic record; and it was his desire to test and develope this theory by more accurate measurements that carried him to Egypt. His stay there has enabled him to produce a book of great interest, both in the narrative of his operations and in their results; and its connexion throughout with metrology, in the most comprehensive sense of the word, renders it a fit work for the consideration of the Geographical Society. Some of the measurements were performed under remarkable advantages, for Professor Smyth had the good fortune to see the whole four of the corner-sockets of the Great Pyramid, as originally excavated in the living rock, uncovered simultaneously for the first time on record. Yet the important measurement between those fiducial points was sorely obstructed by the masses of rubbish that

surround the pyramid, the removal of which is too costly for private means. Professor Smyth shows clearly that the Great Pyramid is not merely the greatest of a class, but stands *alone* in its proportions and constructive arrangements. He shows that though its entrance passages were so carefully sealed, the details of their elaborate structure clearly point to the anticipation of future disclosure, whilst marks indicating the way to such disclosure have even been discovered by Professor Smyth in the masonry of the first descending passage. He has gone far towards establishing beyond doubt the fact—which many still reject—that the pyramid was originally cased with smooth Mokattam limestone (not granite, as some have stated). His measurements demonstrate that the pyramid is (or rather has been) a true symmetrical figure on a square base, the orientation of the sides of which deviates from the truth not more than 5 minutes at most, whilst their *mutual* deviation does not exceed 35 seconds. They prove that the altitude of the pyramid is to the perimeter of its base in the ratio of the radius to the circumference of a circle; that the number of cubits in the length of the base symbolises to a fraction the length of the solar year; that the cubical capacity of the lower course of the King's chamber is just 50 times the interior content of the granite coffer which stands within it; whilst the exterior capacity of the coffer is just double its interior contents. These are only a very few samples of the results of the measurements in which Professor Smyth conceives that he finds the records of a metrologic system of the most scientific kind; of a standard of length based on the length of the earth's semi-axis of rotation; of standards of weight and capacity based on the earth's mean density and on the preceding standard of length; of time standards in the length of the year and the record of the Sabbatic week; nay of a standard of thermometrical and a scale of angular measurement. Some of Professor Smyth's concluding speculations and deductions are, doubtless, a little eccentric, and the least questionable of his results are astounding. But whatever may be thought of the more startling parts of the book, as a whole it is the record of a great undertaking scientifically executed, and it will doubtless produce much discussion among antiquaries and astronomers as well as geographers.

South America.—In my Address for last year I fully discussed, with the valuable aid of Sir Woodbine Parish, the geographical

questions which were solved by the exploration of the river Purûs by Mr. Chandless. That most accurate observer ascertained beyond a doubt that the main branch of the great stream, which he ascended nearly to its source, did not extend to the mountain ranges of Peru. We have since received a full account of the second voyage of Mr. Chandless up the Purûs, and of his exploration of its principal affluent the Aquiry, which he undertook in the season of 1865-6. He found no difficulty in navigating the Aquiry for the first 300 miles, even at the lowest stage of water, and considered it to be perfectly navigable for steamers up to the parallel of 11° s. Higher up it became wider and shallower, and his canoe was finally stopped by a network of stranded timber. After navigation became impossible, Mr. Chandless attempted to reach some river belonging to the Madre de Dios system, flowing from the Andes. He forced his way for a considerable distance through almost impenetrable forest, but, at the end of a week, was obliged to return for want of provisions.

While Mr. Chandless was thus, by an exhaustive process solving, in the negative, the question whether the streams flowing from the Cordilleras of Cuzco and Caravaya formed the river Purûs, our Peruvian Honorary Corresponding Member, Don Antonio Raimondy, was furnishing us with information as to their true course. It appears, from our correspondent's narrative, that the enterprising Peruvian explorer Don Faustino Maldonado constructed a canoe in February, 1861, and embarked on the Madre de Dios with seven companions. He was drowned in passing a rapid, but his surviving comrades continued the voyage, entered the great river Madeira, and eventually reached Manaos on the Amazon, at the mouth of the Rio Negro. As the Beni is the only large river which flows into the Madeira on its left bank, it would appear that the rivers Madre de Dios and Ynambari, flowing from the Cordilleras of Cuzco and Caravaya, and which were so long supposed to be the sources of the Purûs, are in reality tributaries of the Beni. Señor Raimondy's own valuable labours have comprised a careful examination of two tributaries of the Ynambari, in the province of Caravaya; but it is his intention to continue the exploration of this interesting and very important region in future years.

It is with great satisfaction that I have to announce the departure, by the last Brazilian Mail Steamer, of that most indefatigable and accurate scientific explorer, Mr. Chandless, to the scene of his former labours and triumphs. It is his intention, on this occasion, to

ascend the rivers Madeira and Beni, and thus at length to reach those streams flowing down the forest-clad slopes of the glorious Eastern Andes, which he had previously sought in vain at the head-waters of the Purûs and Aquiry. We shall look with much interest to the results of our Medallist's further explorations.

While on the subject of South America, I may mention that the attention of the present energetic and enlightened ruler of Peru, Colonel Don Mariano Ignacio Prado, has been turned to the opening up of the great fluvial highways between the Peruvian provinces in the Andes and the main stream of the Amazons, chiefly by way of the Pachitea, a river which our Lieutenant (now Admiral) Smyth endeavoured to reach in his courageous exploration of the year 1834. Three steamers were employed last year in exploring the Ucayali and Pachitea, and succeeded in reaching Mayro, 325 miles from Lima, on the 1st January, 1867; thus proving the Amazons to be navigable for 3623 miles, from its mouth to the eastern slopes of the Andes near Lima. The hitherto almost unknown River Javarí has also been lately explored, to the extent of about 1000 miles, by a joint Peruvian and Brazilian boundary commission. This laudable activity, while developing the resources of these countries, cannot fail to extend geographical knowledge.

Australasia.—In my last Address I recorded the progress of the Expedition in search of Leichhardt, which had been organised by a Committee of Ladies at Melbourne, incited by our learned and enthusiastic associate, Dr. F. Mueller, and which had been munificently supported by grants from the Colonial Legislatures, besides donations from the Queen and our own Society. Since then the able leader of the expedition, Mr. Duncan McIntyre, much to the grief of the promoters, has fallen a victim to a malignant fever now prevalent along the banks of the streams which flow into the Gulf of Carpentaria.* Before this unfortunate event occurred, Mr. McIntyre had made good progress in searching for traces of the long-lost party, along the banks of the Albert, Gilliot, and Leichhardt rivers; questioning the natives and examining all the reports of white people living amongst the tribes. His journey across the continent, however, from the

* I am informed by Sir George Bowen, Governor of Queensland, in a letter dated 16th December, 1866, that the last accounts report an improvement of the public health in these districts.

River Darling to Burketown, on the Albert, has added but little to our geographical knowledge, the party having followed very nearly on the tracks of the former explorers, McKinlay and Landsborough. The death of Mr. McIntyre occurred on the 4th of June last; and I have lately learnt that Mr. W. F. Sloman, who succeeded to the command, has since also died. In this state of affairs, with the Expedition left to itself on the opposite side of the continent, the Ladies' Committee have entrusted its further management to Mr. Campbell, the uncle of the late leader, who has contracted to continue the search for the remainder of the two years originally contemplated, and has appointed Mr. W. F. Barnett as leader. By the last accounts from the Gulf of Carpentaria, dated December 21st, the party had resumed the search, and had obtained a valuable coadjutor in Dr. White; the camels were reported as in fine condition, and well suited for Australian travel.

In other parts of Australia the acquisitions to our geographical knowledge have been limited to local explorations in search of lands suitable for pasture or settlement. This has been especially the case with the colony of Western Australia, which has of late years added much to our information respecting the northern portions of its territory. Mr. R. J. Sholl has explored the neighbourhood of the Glenelg River and Camden Harbour, but without hopeful results as regards its capabilities for immediate settlement; and on his report the Provincial Government has abandoned the attempt to colonise the district. The settlement of the northern territory of South Australia has also proved a failure, and is now abandoned,—the survey of the neighbouring coasts and rivers undertaken by the Colony, with a view to discover suitable lands for colonisation, having borne no fruit. On the other hand, the progress of settlement in the tropical portions of Queensland, on the eastern coast, and at the head of the Gulf of Carpentaria, steadily continues. Another new township, named Carnarvon, has been formed in the Gulf, on Sweers' Island, to the north of the mouth of Albert River, where the harbour, named by Captain Flinders "Investigator Roads," is the only good one at the head of the Gulf. This is probably destined to become the principal seaport in this part of Australia, and the emporium for the settlements on the banks of rivers running into the Gulf. Upon the general subject of the advance of colonization in Queensland I entered into some detail in my last Address, and need not now recur to it, beyond calling your

attention to the able descriptive paper of Mr John Jardine,* which gives so much information regarding the neighbourhood of our new settlement of Somerset, at Cape York.

New Zealand.—Since the publication of the valuable papers of Dr. Haast and Dr. Hector, on the glaciers and passes of the Canterbury and Otago Provinces, in the Middle Island, New Zealand, in the 34th volume of our Journal, the exploration of the rugged and almost impassable mountain-range which forms the backbone of the island, has been continued by the former of these gentlemen. Owing to the discovery of gold on the western coast at Hokitika, the Provincial Government of Canterbury were anxious to discover some nearer route over the mountains than the circuitous one by the Hurunui and Teramakau or Harper's Pass; and several parties were sent out to find, if possible, other passes. From this resulted the discovery of Arthur's Pass (3038 feet) near the head-water of the Waimakariri, by Messrs. Arthur and George Dobson, and the north Rakaia Pass (4645 feet) by Messrs. Browning and Griffiths, which latter reduced the distance between the east and west coasts by about eleven miles. On Dr. Haast devolved the duty of examining these different passes, and preparing a series of altitude sections by barometrical observations, to serve as a guide to the Government in choosing the best route. The task was accomplished in the latter part of the year 1865; Dr. Haast traversing the various passes, and, on his return to Christchurch, drawing up a series of admirable diagrams in illustration of the subject, copies of which, together with a descriptive paper, he has forwarded to me for presentation to our Society. The north Rakaia Pass was found by Dr. Haast to be deeply covered with snow in the early summer, and he states that the routes by Arthur and Harper passes (although considerably longer) will always be preferred by travellers, as they are seldom obstructed by snow, and are not subject to avalanches.

Conclusion.—In concluding this, the thirteenth, Address which I have delivered to you, I must now assure you that the Council ought to have selected some one younger than myself to occupy your chair. For in truth, my numerous avocations press so heavily upon me, that, with the heartiest desire to serve you, I am too well aware of my inability to efficiently perform all I could wish.

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* *See* 'Journal,' vol. xxxvi. p. 76.

Permit me, however, to explain, that if this Address is not as complete as it ought to be, my chief apology is that, as our anniversary approached, I was in the throes of bringing out a new edition of the chief work of my life, 'Siluria.' But whilst Geology has been the pusuit on which I have established whatever little reputation I possess as a labourer in the fields of Science, I know that you will believe me when I say that I have so loved Geography that I have through life considered these two great branches of knowledge to be inseparably connected. At all events, during my term of office as your President, I have ever striven to the utmost of my power to preserve the efficiency and augment the influence of the Royal Geographical Society.

If, then, you should be pleased to adopt the recommendation of the Council, and re-elect me, I promise you that, if I be spared, I will put forth what energy remains in me to carry out your wishes during the ensuing year. But really, when that term shall have expired, I trust you will place at your head a younger chief; and whoever he may be, I am sure when he has been but a year in office he will declare, as I have ever done, that the Fellows of this Society are men of whose support he may well be proud, and over whom it is a true honour to preside.

MAP OF

the Country between

LEH AND ILCHÍ

Showing the routes taken by

Mr. JOHNSON, CIVIL ASSIST. G.T. SURVEY

in 1865.

English Miles

10 20 30 40 50

Mr. Johnson's Route

Boundary of Kashmir

76 77 78 79 80 81

37 36 35 34

← To Yárkand

Munji

Zilgiá 4396

Piálmá

Jábá

Kárakásh

ILCHÍ 4329

Urangkásh

Dúshumbé

Bezilbí

Dál

Chirá

To Cháchan →

Kiriá 4755

Kárdsa

Polú

Kiriá R.

Taklá Makán Desert

Sanjú 6134

Doá

Kalián

Kávis

Pátí

Korarulukjilgá

Upálák

Kataí Tam

Yalanót Pass 16,760

Chadartásh

Kalián Pass

Boston

Doba

Tarigil

Yangi diwan Pass

Yangi

Guard house

Kherriúz

Kherriúz Pass 16,790

Kherriúz Jungle

Kherriúz Jungle

Imbulgár

Karalung

Sukit 13,500

Sukit diwan Pass 18,230

Chaberi 16,170

Malokshá

Dibla Sherpol

Charoshjilga

Kárakoram Mts.

Kárakoram Pass 18,317

Ladri Pass

Doulatbeg Oldi

Gapshan

Burchi

Sarsil

Sarsil Pass

Changlung

Tutiálak

Pánimik

Tagar

Diskit

Chorti

Khardong

Khardong Pass

Saurla

Saspúl

Basgo

Snimo

Phiang

Leh 11,354

Hiak

Chang La Pass

Tiksé

Himis

Iguí

Upshi

Shera

Mirú

Gia

Lámá Yúrú

R. Indus

Ladák

Yarkand R.

Tyzuk R.

Shayok R.

Nubra R.

Shyok R.

Kárakoram Mts.

Indus R.

Ladák

Kiriá R.

Chang Chenmo R.

Pangong Lakes

Tsothang 17,024

Burcháthang 17,425

Nischú 17,680

Lungkung Pass 19,501

Lungkung

Kiam Hot Springs

Kiang La Pass

Pamchálan

Rimdl

Chagra

Másimik Pass

Durgá

Mughil

Láksung

Saspúl

Sowar

Chushul

Kibling

Karnak

Noh

Chushul

Mópothang 15,959

Huzákhai

Kámát langar 17,790

Yanki langar

Bishá diwan 10400

Bishá

Papiá

Olgá

Matak

Chuich

Tassá

Karsa

Pishú

Karangotak

Kepsáng 10650

Brongá

Nuá Khan Pass 18660

Mazar

Hindotak diwan Pass

Pishú

Yangpá R.

Tüsh

Yangi diwan Pass 19,092

Chanti diwan Pass 17,500

Yangpá 15,279

Kepsang Pass

Kárakash R.

Kárdash

Yurung R.

Qara R.

Kiriá R.

E. 61

E. 62 21,262

E. 63 21,252

E. 64 21,572

E. 57 21,767

E. 58 21,671

K. 2 28,278

K. 6. 25,119

K. 19

K. 20

K. 25

K. 29

E. 32

E. 43

E. 44

E. 40

E. 38 (b)

E. 52

E. 53

E. 54

E. 55

E. 56

E. 58

E. 51

E. 31

E. 36

E. 23

Edw.d Weller

Published for the Journal of the Royal Geographical Society by J. Murray, Albemarle Street, London, 1867.

PAPERS READ

BEFORE THE

ROYAL GEOGRAPHICAL SOCIETY

DURING THE SESSION 1866-67.

[Forming Vol. XXXVII. of the Society's Journal.
Published April 25th, 1868.]

I.—*Report on his Journey to Ilchí, the Capital of Khotan, in Chinese Tartary.* By Mr. Civil-Assistant W. H. Johnson, F.R.G.S., Great Trigonometrical Survey of India.

Read, November 12th, 1866.

A detached party of the Kashmir Series of the Great Trigonometrical Survey, under my charge, left Dehra Doon on the 27th May, proceeded *viâ* Simla and Rámpur, and, on the 17th July, arrived at Leh, where I was obliged to halt the camp for a week, to enable me to make the arrangements necessary for my further progress.

On leaving Leh I took the well-known route *viâ* Tikse and Táñksí to the Pangong Lake, and then crossed over the Másimik Pass, to the encamping ground of Pamchálan, in the valley of Chángchénmo. I then marched eastwards up the Chángchénmo Valley, halting at the celebrated hot springs known as Kíam, and again at Lúmkáng; thence I marched northwards and crossed a pass called by my shikari the Lúmkáng Pass, over a range of hills, which, running from east to west, rises to a height of about 3000 feet above the Chángchénmo Valley, and forms its northern boundary. I then marched in a northerly direction on high extensive table-lands, which might be called plains in comparison with the rugged ranges of the Himalayas, for they have a greater extent of level than of hilly ground, and the hills are low and have such easy slopes, that a horse may be galloped over them everywhere. The first plain is about 17,300 feet above the sea-level; it bears traces of having been the bed of a large lake, and at present contains two lakes, which, when I saw them, covered areas of about 16 and 60 square miles respectively, and are probably much larger in April and May, on the melting of the snows. A second plain slopes for a

distance of 30 miles in a north-easterly direction from 16,700 feet down to 15,300, when it rises again towards the watershed of the Kíun Lun. I traversed these two plains, and skirted a third lying to the north-west of the second. From the hills I ascended I noticed other plains of considerable extent to the east and south-east, which are believed to merge into the Chángtháng Plains of Rudok. On the other hand, to the west, there were no plains, but a series of deep valleys, which are the sources of one of the principal affluents of the Kárákásh River. I struck this river at a point 6 miles west of the G. T. Station on the Kíun Lun, which is marked E 57 (lat. 35° 53′ 36″, long. 79° 28′ 32″, height 21,767). At this point the height of the river is 15,500 feet. Its sources are about 25 miles distant to the S.E., in a spur from the Kíun Lun, which separates the valley of the Kárákásh from the second of the plains already noticed.

I may here state that I gathered from native information that the Kíun Lun range stretches in an easterly direction for a distance of about 100 miles from the sources of the Kárákásh River, and then terminates on an extensive plain, communicating with the Chángtháng Plain. I was informed that by skirting the Kíun Lun range, wheeled conveyances might be easily taken from Ilchí to the Chángchénmo Valley near Leh; that water, grass, and wood, are obtainable at every halting-place, and that the only difficulty is the liability to meet with opposition from the shepherds of Rudok, in the portion of the route which passes across the Chángtháng Plain.

I ascended three peaks of the Kíun Lun range, which had been previously fixed by the Trigonometrical operations of the Survey, and which, having no names, are known by us as E 57, E 58, and E 61. The contrast between the view to the north and that to the south was very striking; on the one side there was little but plain, on the other mountains and deep valleys. I might almost have fancied myself on one of the southern ranges of the Himalayas, with the plains of India to the south, and great mountain ranges to the north, excepting, that in consequence of the great altitude of the Kíun Lun peaks, the mountains to the north were generally lower than those on which I was standing.

From these peaks, however, I could not get a view of any of the important towns of Khotan, which I was so anxious to see, and I should have been obliged to have been satisfied with the extent of exploration which I had already accomplished, had not an opening presented itself for me to proceed to Khotan, under the protection of the kháñ of that country.

While I was in Leh, a native of Central Asia presented me a

letter from the Kháñ Bádshá of Khotan, inviting me to enter his territory, as he wished much to see me; he also stated that the kháñ, having heard the previous season of my being in the neighbourhood of his boundary, had sent men at that time to induce me to see him, but that I had left Sukit, and returned to Leh, before his messengers arrived at the former place.

The receipt of this letter, in which the Kháñ of Khotan agreed to render me every assistance, and to permit me to return to Leh, after a short stay in his capital Ilchí, together with the personal statements of several merchants and traders of Leh and Yárkand, emboldened me to undertake the risk of visiting the Khotan country, thinking by this enterprise to be able to furnish information of value to our Government, as regards those provinces of Central Asia, which are at present almost unknown to Europeans, and also of the movements of the Russian forces in those parts of the world.

On arriving at the source of the Kárákásh River, I despatched the Khotan messenger, whom I had brought away with me from Leh, with a letter to Habíbullá, Kháñ of Khotan, proposing that I would visit him, provided he sent either of his two sons, or his wazeer, to receive me at the first village on the northern side of the Kíun Lun range of mountains.

While waiting at the Kárákásh for a reply to my letter, I employed myself in visiting several peaks, in order to fix sufficient points on the plane table for extending the work across the Kíun Lun range, and in taking observations for determining the rate of my watch.

The bearer of my letter returned on the twentieth day after his departure, accompanied by a beg, or governor of a small province, and an interpreter, with a letter from the kháñ, pressing me earnestly to visit him, with promises to take every care of me while I continued in his territory, and informing me that he had despatched his wazeer, Saifullá Khojá, to meet me at Brinjgá, the first encampment beyond the Ladák boundary, for the purpose of escorting me thence to Ilchí.

On the 6th September I started from my encampment at the Kárákásh towards Brinjgá, which I reached in four days, and found the wazeer awaiting my arrival. It took me 16 days in all to march from the Kárákásh to Ilchí. The road was very difficult, and the pass by which I crossed the Kíun Lun was said to have been only very recently discovered by Jumá Kháñ, the Khotan ambassador to the British Government, who was compelled to find his way over this part of the range, because the regular road from Ilchí to Leh, *viâ* Sanjú and the Kárákoram Pass, was in the hands of the Yárkandees, who were then at war

with the people of Khotan. I have described this route in full in Route No. I. accompanying this report.

On my arrival at Brinjgá I was received by the wazeer Saifullá Khojá, and further on at the town of Urangkásh, which is three miles from Ilchí, by the kháñ's two sons, escorted by cavalry and infantry, and was accompanied by them to the capital, where I was very comfortably housed in the old Chinese fort. I had interviews with the Kháñ of Khotan and his two sons almost every day of my stay in the place.

The Kháñ Bádshá of Khotan is about eighty years of age, of good stature and appearance, and about 6 feet in height; rather stout, but well-built, and of a very fair complexion. He is seen to great advantage when dressed in his robes of state, which consist of a choga of silk, worked over with gold thread, and a large white puggrie (turban) tied after the Mogul style. He is reported to be very ill-tempered, and very strict in his government. I must, however, admit that he showed me much kindness while in his country, and kept all his promises, with the exception of not allowing me to leave the place, after a stay of four days, as had been agreed upon; and in wishing to keep me with him altogether,—which he would have done, had I not pointed out to him the uselessness of his doing so. He wished to detain me as a hostage, until such time as the British Government sent him assistance, in the shape of troops and arms, against the Khokánees, or Andajánees, and the Russian forces, which latter are daily approaching towards Yárkand and Khotan. The Kháñ of Khotan mentioned to me that he and his second son travelled through India, *viâ* Peshawar, Mooltan, and Bombay, to Mecca, in 1861, and returned to Khotan in the early part of 1863, passing through Persia, Turkestan, and Khokán, and penetrating for some distance into Russian territory. On his return he was made the chief kází of Ilchí, and within a month he succeeded in raising a rebellion against the Chinese, which resulted in their massacre, and his election by the inhabitants of the country to be their Kháñ Bádshá, or ruler. The province of Khotan was the first in which the Chinese were destroyed, and the example was followed in Yárkand, Aksú, and other cities. As the result of his own observations, and the experience he has derived from his travels, the kháñ also informed me that he found the inhabitants of India enjoying greater advantages as regards justice, liberty, and freedom from oppression, than any other country. The Russian principles of Government he said were oppressive, particularly the conscription, which forces men to serve in distant parts of the empire, far away from, and with but little

chance of revisiting, their homes. The Khokánees also dread the country of Sibar (Siberia), which they are aware is the penal settlement of the Russian Government.

Khotan, which was formerly a province of China, is now independent,—the Mahomedan population of Yárkand, Khotan, Káshgár, and other provinces of Central Asia, having, in 1863, massacred all the Chinese in those parts, save a few who adopted the Mahomedan religion.

The whole country of Khotan north of the Kíun Lun range, including seven parganás of Yárkand which had submitted to the kháñ during my stay in Ilchí, is an immense plain, sloping gently downwards to Aksú, which place is fifteen long marches north of Ilchí. This entire plain is watered by numerous small streams and some large rivers, which are the principal affluents of the Tárim or Argol River, which, in its turn, disembogues into the great lake called Lob Núr. The whole country is irrigated by canals from these rivers.

At a distance of six miles to the north-east of Ilchí is the great desert of Taklá Makán (Gobi) which, with its shifting sands that move along in vast billows overpowering everything, is said to have buried 360 cities in the space of 24 hours. The edge of this desert has the appearance of a low range of broken hills, and consists of hillocks of moving sand, varying in height from 200 to 400 feet. Tea, of which I have brought away a sample, was dug out of one of these entombed cities while I was at Ilchí, and was believed by the natives to be of great age. Gold coins,* weighing 4 lbs., and other articles, are also reported to have been found in some of them, but the positions of these cities are only known to a few persons, who keep it a secret in order to enrich themselves. The only one that is well known is that in which very large quantities of brick tea are found, and which commands a ready sale in the markets, now that all trade with China is stopped. The site of this buried city is a mile to the north of Urangkásh.

The soil of the country is mostly sandy, and quite free from stones and rocks; it is very productive, from the circumstance of the fine dust being carried by currents of air from the desert

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* I endeavoured to obtain ancient coins and records, but was informed that none were procurable at Ilchí and Yárkand, but only in Káshgár, the latter being an ancient city, and one of those which escaped being buried by the desert. Ilchí and Yárkand are reported to have been founded after the above-mentioned destruction, and are therefore considered new cities. This statement appears to have some foundation, for I never saw or heard of a single ruin, though I made every inquiry, while Káshgár is said to contain extensive ruins.

and deposited in the plains. During my stay at Ilchí I noticed this phenomenon on several occasions; although there was no wind blowing, the whole atmosphere was so thickly filled with dust, that I was obliged to use a candle at mid-day to be able to read large print. The dust which fell was of an extremely fine quality, and of a very light colour, resembling pulverized clay. The inhabitants declare that this deposit is as good as manure for the soil, and that no vegetation would thrive without it.

The chief grains of the country are—Indian corn, wheat, barley of two kinds, bajra, jowar, buck-wheat, and rice; all of which are superior to the Indian grains, and are of a very fine quality, from the circumstance of the climate being mild and more equable in temperature, with moderate rain in slight showers occasionally. The country is certainly superior to India, and in every respect equal to Kashmir, over which it has the advantage of being less humid, and consequently better suited to the growth of fruits. Olives, pears, apples, peaches, apricots, mulberries, grapes, currants, and melons—all exceedingly large in size and of a delicious flavour—are produced in great variety and abundance. Besides these, the plant from which the charas is extracted is met with in almost every field; it differs slightly from the charas plant as found in India, having broader leaves, and growing to a larger size. Cotton, of valuable quality, and raw silk, are also produced in very large quantities.

The principal forest trees are the poplar, willow, and tamarisk. About the towns and villages these trees have been mostly planted, but between Khotan and Aksú, for a distance of twelve marches, there is such a dense forest of them that travellers are said to have lost themselves in it. Some of the poplars are reported to be of an immense size, and are used for the purposes of house building. The whole country is very rich in soil, judging from the splendid grass which is found wherever water has flowed over, even for a single day. I have a great variety of grasses, &c., as samples. The greater portion of the country is waste, for want of inhabitants, and the present produce is more than sufficient for the wants of the comparatively small population.

The whole country, especially the Kíun Lun range of mountains, is wealthy in minerals, viz.: gold, silver, iron, lead, copper, antimony, salt, saltpetre, sulphur, soda, and coal; of this last I have samples. It is found near the village of Dúá in Khotan, and to the west of Yárkand, on the road to Káshgár. Gold and precious stones are chiefly found in the beds of the

streams, which issue from the Kíun Lun range, and in very large quantities about Kárangoták, Kíríá, and Chírá. It is said that 3,000 men are daily employed in the gold-fields. The ordinary value of gold in Khotan is Rs. 9 to 10 per tolá, while in Kashmir the same quantity sells for 17 to 18 Rs.: this circumstance alone will show how abundant gold is, and how large a quantity there must be at the present time in the country.

The principal towns in the country of Khotan are Ilchí, Kárákásh, Urangkásh, Chírá, Kíríá, and Ták. Those of Yárkand are Yárkand, Poshgáoñ, and Kargalik; and those of Káshgár are Káshgár and Yangíshahar.

The villages of Khotan are mostly small (with the exception of Kárangoták and Cháchan, which were Chinese penal settlements), and scattered, while those of Yárkand, such as Sanjú and Kugíár, are very large.

Of the cities above mentioned, Yárkand is the largest, and is a great place of trade. The Bokhárá and Khokán caravans with sugar-candy, loaf-sugar, cloth, wrought iron, brass, iron vessels, and other articles, which are brought from Petropavlovsk, Semipolatinsk, Troitska, and Bokhárá, after passing through Khokán, visit Yárkand twice a year, with as many as a thousand camels. Traders also from Vernoe, Ak Masid (Fort Perovski), and Ilí, with horses, China tea, and silks, frequent this city in great numbers.

Ilchí is next in importance, and is a great manufacturing city; the chief articles of manufacture are silks, felts, carpets, both silk and woollen, and coarse cotton cloths; some of these are used up in the country, and the rest exported to Yárkand and Leh. The raw silk produced is of very coarse texture, owing to bad reeling. Paper is also made out of the mulberry fibre, and exported westwards.

Bazars or fairs are held in the city once or twice a week, in which most of the trade transactions in goods and animals take place. The Ilchí bazar, which I visited, presented a very lively scene, both men and women being very anxious to buy and sell. I noticed that during these fairs very large quantities of meat, including camel and horse flesh, were consumed by the people of Central Asia.

The wild animals seen in the country are the goat, wolf, jackal, fox, and hare, all of which are of the Tibetian species. Bears, tigers, and leopards, are said to exist in the forest between Khotan and Aksú. Among the wild birds are geese, ducks, chikoor (large and small), pigeons, quail, kites, crows, and hawks, of which last species the karál (bear coot) is very

large, and of a black colour; this bird is kept by the natives for the purpose of hunting wolves, jackals, &c., which it seizes with great energy.

The domestic animals are camels (Bactrian), horses, mules, asses, cattle (Tibetian and Indian), goats, and Dumbá sheep. The goats are to be met with in large flocks. Of the above, the camels and asses are used for lading, and the horses for riding and drawing wheeled conveyances which resemble the Indian country carts, but are lighter; they are generally drawn by four horses, one being in the shafts, while the other three go abreast as leaders. Most of the horses in the country are not bred there, but are imported from Badakshán, Ilí, and the country of the Kilmák Tartars,—the large horses being from the former place, and the ghoonts from the latter, where they are reported to be very numerous, one shekh alone being said to have 10,000 mares.

The domestic birds are geese, ducks, and fowls, the latter being very abundant.

The chief sports of the country are hawking and a game called Boj-Bájí (sheep wager), which consists in horsemen racing after one of their number, and trying to get possession of a sheep which he is carrying: this game is carried on until both horses and men are completely exhausted. The men of this part of Central Asia are mostly excellent riders; almost every man has one or more horses, and they seem to have a great dislike to walking.

The population of Ilchí is about 40,000, and that of the whole country of Khotan about 250,000, the females preponderating over the males to the extent of twenty per cent. This inequality of the sexes is attributable to a number of males having left the country, some having been banished, and others killed during the late disturbances with the Chinese, Khokánees, and Kucháreés. The men are mostly fine-looking, with fair complexions, and very well built; the women are rather short, but pretty; both sexes have a slight Tartar cast of features, and it is remarkable that both men and women are well and cleanly appareled. The inhabitants are all Mahomedans. They speak the Turkí language, and, judging from the numerous prayers they repeat, are very strict in the observance of their religious requirements.

The taxes of the country are moderate. The kháñ takes a tenth of all the produce, also of the gold and animals of the country; the same tax is levied on exports and imports, but the kháñ intends increasing the rates of taxation on goods imported from Leh, so as to equal the heavy duties imposed by the

Maharajah of Kashmir on the exports from Khotan. The kháñ informed me that he was dissatisfied at the exorbitant taxes levied on the exports from his country at Leh by the Maharajah's officials.

The current coins of the province are the kurus and pice. The kurus is a piece of silver, about 3 inches by 2, and about $1\frac{1}{2}$ inch in thickness, shaped like a boat; in Kashmir its value is Rs. 166, though it weighs only 160 Company's Rs., the price being in favour of the kurus from its being almost pure silver. The pice are made of copper, about the size of our Company's pice, with a hole in the centre. They are generally to be had in strings of 50, which is called a tángá. In Khotan the value of the kurus fluctuates much, sometimes a thousand tángás of pice are paid for a kurus, at other times only 380 tángás. While I was in Khotan the rate varied from 600 to 380 tángás. There is also another coin called "kursí," shaped like the large kurus, but its value does not exceed Rs. 16, the silver being impure. Gold is not current, but is sold in small packets, each containing a little more than 3 tolás; five of these packets are given in exchange for a kurus. The Khotanees use no weights, but dry and liquid goods are sold by measures. Their cloth measure is also nearly equivalent to the English yard.

The Kháñ of Khotan has an army consisting of 6000 infantry and 5000 cavalry; all, however, being very badly equipped, having only Chinese weapons. He has likewise a large artillery; I counted sixty guns of brass and iron, of all sizes, up to 12-pounders. The cavalry is commanded by Masúm Kháñ Khojam (sahib), the kháñ's second son; the artillery by Hájí Abráhím, also styled Lashkar Cháñ, his eldest son; and the infantry by a person who calls himself a Pathán, but whom I consider a suspicious character, probably a fugitive mutineer. The latter spoke Hindostaní, and told me he had been in India, and had eaten the salt of the English. He and a trader from Jummoo, and a fakír, who said he had been a sepoy, were the only persons with whom I could converse without the aid of an interpreter.

The sons of the kháñ are rather short, being about 5 feet 8 inches in height; the eldest is slender, and very intelligent, while the other is rather stout and dull; both have fair complexions, but the latter has Chinese features. They are generally dressed in chogas of black satin, and gold-worked caps. The eldest son is the chief personage about the kháñ, and is the keeper of the seals and treasury.

The usual route from Leh to Ilchí is over the Kárákoram

Pass, and through Sanjú; but there are several others, which, however, have not been much used till very lately, viz.: the Hindoták diwán, the Brinjgá diwán, and the Polú route. The last of these is the best, as it lies over vast plains, where water, grass, and wood, are obtainable at every halting-place. It is reported that wheeled conveyances may be taken from the Chángchénmo Valley and Rudok to Ilchí and Yárkand by it; the only difficulty which exists is, that a portion of the route passes across the Chángtháng Plain, which is occupied by shepherds from Rudok, who closed the road last year to travellers proceeding between Leh and Ilchí. I have submitted a few remarks relative to this and other routes, which will be seen in the sequel.

The route over the Kárákoram Pass is good but very difficult, owing to the want of grass and wood, the difficulties being enhanced at certain seasons of the year, when no water is obtainable, the whole of the rivers and streams, including the great Níobrá, being frozen over. The cold is so intense that men and laden horses have been known to be frozen to death while in the elevated plain between the Níobrá and Kárákásh rivers. While I was marching over this place, in November, the cold was so great that I and the natives with me could get no sleep during the nights, and our beards used to be covered with icicles while marching along the road in the sun. The thermometers which I had could not show the temperature, as they were not graduated below 15° Fahrenheit. This route is sometimes infested by Hunzá robbers, who have established themselves at the village of Shingshál, situated a little north of the Kárákoram. Only so lately as last season they plundered a very large caravan while on its way from Yárkand to Leh, and carried the traders and their goods away to their own country, where they sold the former as slaves to traders from Badakshán, Chitrál, and Khokán.

The Hindoták Road, which leaves the Kárákoram route at Sukit, lies for two marches up the Kárákásh River, and then crosses over the Kíun Lun range by the Hindoták Pass. This route is short, but very difficult, and can only be used by foot passengers, on account of very difficult and extensive glaciers on the northern side of the pass.

The Brinjgá route, the one I travelled over, crosses the northern ridge of the Chángchénmo Valley, and over immense plains perfectly uninhabited and void of all vegetation, with the exception of the lavender plant, which is stunted, and only found occasionally; fresh water is also very scarce, that of the numerous lakes in these plains being very brackish, and in

many places undrinkable, owing to the whole of the country being covered over with a deposit of saltpetre and soda, to the depth of from six inches to a foot. The plains have once been the beds of three vast lakes, judging from the water-marks and banks which are distinctly visible. At the northern extremity of these plains the road dips suddenly down to the Kárákásh River, where a little grass and wood are found, and thence leads up the snowy passes of Brinjgá, which are very high and difficult, from the circumstance of there being immense quantities of snow and ice on them; horses can be taken by this route, but not without a portion of the road between the Kárákásh and Brinjgá being cleared of snow and stones. From the encampment of Brinjgá the road follows down a ravine for one march, and then crosses over numerous passes and streams, including the Khotan River, which is crossed by a wooden bridge, till it gets into the plains of Khotan near Beziliá. The route, on the whole, is very difficult, firstly from the intense cold and the want of fuel and water at the above-mentioned places, secondly, from the height of the passes of Brinjgá, and lastly, from the road between the latter place and Beziliá being very steep and dangerous, owing to the numerous ascents and descents which are met with.

There is also another route from the sources of the Kárákásh River to Khotan *via* Shádulá; it follows the Kárákásh River the whole way, passing the above-mentioned place on the sixth day. The portion of this route between Shádulá and Khotan can only be used in the depth of winter, when the water is very low, as the river, which is of considerable size, has to be forded frequently. The Khotan people declare this is the route which was taken by Rustam, a famous hero, when he travelled from Káshgár, the place of his abode, to Rudok and Lássá.

The routes chiefly used by traders from Leh to Yárkand are those *viâ* Kugiár, Kalián, and Sanjú; of which the two last named are closed during the winter from the passes being high, while the former is open all the year round, but dangerous at all times, from its being infested by robbers. The taxes at Leh are now levied by Mangaljú, thánedár of Ladák, and not by contractors, as formerly. It is an extraordinary arrangement that most of the traders from Leh to Yárkand are agents of the Maharajah, and do not sell their own goods; this custom interferes with general trade. The thánedár, being the customs' officer and chief official, has power to demand whatever cess he thinks proper from traders who are not agents of the Maharajah. In conversing with the traders and others on the subject of improving the trade between Central Asia and the Punjab, I

learnt that they were anxious that a competent Government agent (a European if possible) should be located at Leh, to look after the interests of the traders, who, I must admit, are badly treated, and to maintain friendly relations with the people of Central Asia, who are very well-disposed towards the British Government; great advantages, both commercial and political, were expected to result from such a measure. There was also a wish that the several routes beyond the Kárákoram should be made safe, by the Maharajah detaching guards of adequate strength to occupy the ground within his boundary, in the vicinity of the plain called "Khérgis Jungle," on the Kugíár route, and at Shádulá and Ilnagar on the Sanjú route. The guard of twenty-five men which the Maharajah had at Shádulá last season proved insufficient for the protection of the káfilás, as some of them were plundered by robbers. The object of having these guards stationed along the route is to enable them to escort caravans when passing over dangerous ground. The road from Leh to the Kárákoram requires to be repaired and put into thorough order, to enable laden ponies to travel in safety, especially over the Sarsil and Khardong passes. This could be effected by the Maharajah at a very moderate outlay, and would be a great boon to traders, who, under present circumstances, almost dread going over the places referred to, owing to their horses being lamed by the sharp stones on these passes, where no footpaths even exist. That some steps of this nature are necessary is evident from the numerous carcasses of animals to be seen in every direction. If the Maharajah, following the example of the Chinese, erected post or rest houses on the road from Leh to Yárkand at the several halting-places within his territory, the inconveniences of travelling in that rugged and barren country would by no means be inconsiderably lessened.

These remarks merely refer to the shortest and most direct routes to Yárkand and Khotan, which would certainly be preferred to the route *viâ* Polú, did the former not labour under the disadvantages named. I would, however, desire to offer a few remarks on the newly suggested route from the Chángchénmo and from Rudok, *viâ* Chángtháng to Polú, a village five marches south-east of Ilchí. The only hindrance to this route, now that friendly relations have been established with the Kháñ of Khotan, is the opposition of the Tartar shepherds of Rudok, who, I am of opinion, could be induced to allow traders to pass through their country by the offer of a small pecuniary payment, guaranteed by the British Government. The opening of this route would be particularly advantageous

to the Punjab traders, as they could evade the taxes levied at Leh, by proceeding direct to Rudok, *viâ* the Hindostan and Tibet Road, up to the Chinese boundary, after which they would pass over the Chúmurtí plains to the Indus, and thence to Rudok, without touching on the Maharajah's territories. Rudok can also be reached from Kúlú and Mandí by crossing the Bárálachá Pass, and going over the Rukshú Plain to Hánle, but this is in the Maharajah's territory. The route *viâ* Rudok and Polú, though circuitous, has many advantages over others, the chief of which are—that wood, grass, and water, are obtainable at every stage; that the road passes over no rugged and high snowy ranges like the Sarsil and Kárákoram passes; that it is safe from robbers; that it leads not only to Ilchí and Yarkand, but also, *viâ* Lob, to the large and important city of Káráshahar, situated about 300 miles north-east of Ilchí, and which, with numerous other places of note, are occupied entirely by Kilmák Tartars, and are on the high road from Káshgár and Ilí to Pekin. By this route, the highly-valued Ustarfání shawl wool (superior to the Chángtháng), which is produced from the goat found in the Aktág or Thian-shan range of mountains, and a variety of other merchandise may be brought down in large quantities for the Punjab and English markets. At the present time there is an excellent opening for exports from India, because all trade between China and the Mahomedan states of Central Asia is at a complete stand-still. The Mahomedans, being great tea* consumers, would gladly receive Indian teas, at rates which would probably be very remunerative, while the Kilmáks and other Tartars would be excellent customers for opium, which may be sent to Káráshahar and the cities of the East. By this route Ilchí may be reached from the north-west provinces of Hindostan, viz.: from Delhi, Rohilkund, and Meerut, to Gartok (or Gartope), lat. 31° 46′, long. 80° 30′, and Rudok, lat. 33° 24′, long. 79° 25′, *viâ* Almorah and the Nití Pass, and *viâ* Mussoorie and Gangotrí, over the Nílang Pass; both the routes being very feasible, especially the Nití one.†

If the several measures suggested in the preceding paragraphs were fully carried out, not only would the trade with

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* Whilst in Khotan I was informed that there was a great demand for tea since the stoppage of the trade with China, and that the people of the country would gladly purchase Indian teas, if obtainable. The inhabitants of Khotan are great tea-drinkers. All who visited me, rich or poor, asked for a cup of tea, which is drunk with sugar, but without milk. As a mark of respect, a cup of tea was presented to me by the Kháñ of Khotan himself, on my first interview with him. The brick form of tea is preferred to every other.

† Beyond Rudok and Gartope there is a village called Mínsar, lat. 31° 10′, long. 80° 50′, from which the maharajah receives a revenue of Rs. 500 per annum.

Central Asia be increased and improved, but the advantages, in a political point of view, would be considerable, as it would secure a ready market for the products of India and Great Britain, and afford us a better knowledge of the countries north of the British frontier.

The Kháñ of Khotan resides in the old Chinese fort, which is built of earth, and consists of an inner wall about 20 feet high, and an outer one of 5 feet, with a ditch outside. The houses in the fort, including the kháñ's dwelling, are all built of mud and wood, the doors and windows being of lattice-work (very like those in Kashmir). Whilst I was in Khotan, a mud wall, 25 feet high and 20 feet thick, was building round the entire city of Ilchí. Similar walls are also constructed at Jábá, Píálmá, and Gúmá, their object being to secure the inhabitants of these places against sudden attacks. The kháñ has done away with all the Chinese customs, except that of keeping watchmen, who patrol the streets of the fort and city at night, and make a great noise by striking a hollow piece of wood with a stick. He has also retained the Chinese instruments of torture, viz., the rack, which is worked by screws; the tread-mill, and another instrument for extorting confession, which consists of a wooden bed covered with sharp stones and gravel, on which a culprit is made to kneel, while a log of wood is laid over the knee-joints, thereby causing excruciating pain. Hanging and blowing away from guns are the methods of capital punishment; gallows are erected in various parts of the city. Flogging with a leather thong is also largely resorted to; men and women being flogged indiscriminately. The kháñ is trying to improve the morals of the latter, which were none of the best during the time of the Chinese, from the fact of their coming into Turkestan without their families, and keeping the women of the country.

During my stay at the capital of Khotan I employed myself in extending my researches, by making a hasty journey to the town of Kíríá, situated about 40 miles east of Ilchí. I rode there in one day, on horses posted for me by the khán; spent a day there, and returned on the third, having meanwhile left my things in Ilchí. I also visited the site of an old city near Urangkásh, from which brick-tea is exhumed. I experienced great difficulty in taking observations to the sun and the pole-star for determining the latitude of Ilchí. The kháñ, though he offered no objection to my using the plane-table, expressed himself decidedly opposed to my taking astronomical observations, alleging, as a reason, that his courtiers considered that it might be a preliminary to the country being taken possession of by the

British Government. In consequence of this obstruction, I had to resort to the expedient of locking the door of the court-yard fronting the house I occupied, to carry out my object. The instructions to my men to keep off intruders were not easy to enforce, as my actions were closely watched, and the kháń's sons were in the habit of calling to see me at all hours of the day, and very frequently at night. After leaving Ilchí, I was not able to observe for latitude at any other place, save Sanjú, where, by the happiest chance, I put up in a house with a large hole in the roof, which admitted of my observing with the 8-inch theodolite. Here, too, as at Ilchí, I was obliged to take the precaution of locking the door. Boiling-point observations for determining heights were taken at every halting-place, Ilchí included.

It will not be out of place also to mention that, on three occasions, I was asked by some of the natives of Yárkand to visit that city, and take possession of it in the name of the British Government; but I explained to them that I had not visited Khotan in any official character, but simply as a surveyor, come to survey, and desirous of information as to passing events, and not to carry out any political objects. I was informed that the Yárkandees, Káshmirees, Baltees, Tungánees of Yárkand, and other towns and villages, had clubbed together, and collected three lacs of rupees and khilats as a present for me, if I would only come on and take up the governorship of Yárkand, as they were tired of anarchy, confusion, and constant warfare with one another, and oppression at the hands of the Khokánees. The promise of this sum of money and offers of governorship were presented to me in writing by the beg of Kugíár (parganá of Yárkand). Had not Yárkand been in a disturbed state, I would certainly have visited it in the course of my operations to collect further information; but the country and city were reported to me to be divided, and held by three separate parties or factions, viz.: 1st. The old Chinese fort and city by the Tungánees, who are Mahomedans, and were employed as paid soldiers by the Chinese, against whom they mutinied in 1863. These Tungánees are not men of the country, but come from the far east, near the confines of China Proper. 2nd. The Mahomedan town was held by Kashmirees and Baltees of Iskárdo, from the territories of Maharajah Rumbeer Sing. They have settled in Yárkand in large numbers; the former for the purposes of trade, and the latter, being agriculturists, for the cultivation of the charas plant, which they have brought to great perfection. 3rd. The country about the city was reported to be occupied by the Khokánees, who, on being pressed by the Russians, deserted

their own country, and, through the aid of the Chibchák, governor of Káshgár, took possession of the country of Yárkand. From my inquiries I am of opinion that the natives of Yárkand are very like those of Kashmir,—a servile race, constantly conquered and oppressed by the neighbouring states.

The Kháñ of Khotan, at the final interview I had with him, after entrusting a letter to me for His Excellency the Viceroy of India, together with the presents (four horses and two pairs silk carpets), all of which were delivered over by myself to the Assistant-Secretary to the Government of the Punjab, asked me to beg of the British Government to send him assistance in the shape of troops, arms, &c., and said that he would supply carriage and provisions from his boundary to Ilchí, but that he could not afford to pay the troops, as his country was poor; he, however, proposed that our Government could reimburse themselves by annexing the cities of Yárkand, Aksú, &c., to which step he would render every assistance. As far as I could observe, it seemed to me that arms and ammunition, with a few blacksmiths and tools, were all the material aid needed by this friendly power. With these, and the loan of some native non-commissioned officers to drill and discipline his troops, who are accustomed to warfare from their continual conflicts, the kháñ would be enabled to repel aggression, and preserve the independence of his territories.

Before taking my leave of the kháñ he presented me with a yellow Kímkháb choga, as a dress of honour, a Yárkand pony, and a carpet. In return, though he objected to my using the 8-inch theodolite, he expressed a great desire to possess the instrument. I explained to the kháñ that, as the arms bestowed on a soldier were the property of the State, so the theodolite in my charge was only entrusted to me for a given purpose, to enable me to carry on my duties, and that I should be disgraced if I returned without it, and would incur the displeasure of my superiors if I parted with the instrument. I also made the kháñ understand that the theodolite would be of no use to him. As a compromise, I took upon myself to tender two telescopes, the property of Government, for his acceptance, and in my own behalf made the following offerings:—A double-barrelled rifle, a revolver, a hog-skin saddle, a set of head-stalls and reins, a pair of epaulettes, which I had provided myself with in anticipation of needing to make presents on the frontier, six country swords, stationery to the amount of 15 rupees, a supply of gunpowder, shot, and gun-caps, besides cloth, and other trifling articles. To the Kháñ Bádshá of Khotan I presented the customary nazar of the country, viz.: 5 kurus, or 833 rupees, and to

his men on escort duty with me on several occasions cash to the amount of about 635 rupees.

On the 4th of October, after a stay of sixteen days, and after exacting a written promise from me to return to Khotan, if permitted to do so, the kháñ allowed me to take my departure. On leaving Ilchí, I first travelled along the high road which leads to Yárkand to the village of Zilgíá, at which place I halted my baggage for three days, and pushed on by post-horses to visit the villages and towns along the same road as far as Luk, in the Yárkand territory, and about 36 miles east of the city. After advancing into Yárkand as far as it was safe for me to proceed, I returned by the same route to Zilgíá, from whence I proceeded to Sanjú, in lat. 37° 3′ 57″, and long. 78° 29′ 30″, and crossed into the valley of the Kárákásh River, by the Walágot or Sanjú Diwán Pass. I then followed the course of this river, marching up its right bank for four days, to the Maharajah's guard-house at Shádula, in lat. 36° 6′ 15″, and long. 78° 29′ 30″.

On my route from Sanjú to Shádulá I passed several encampments of Khérghiz shepherds, on either side of the Walágot Pass. These people are difficult to deal with, being noted robbers. Twice they insisted on examining my baggage for valuables; but, finding none, they permitted me to proceed without further molestation, on being entreated to do so by Rojí, beg or governor of Sanjú, who was ordered by the Kháñ of Khotan to accompany me as far as the Maharajah's boundary, for the purpose of insuring me a safe passage through these Khérghiz, with whom the beg of Sanjú is on friendly terms, owing to these shepherds visiting Sanjú occasionally for the purpose of bartering their sheep for other necessaries of life. The Khérghiz are Mahomedan shepherds, and are to be met with in the mountains to the north of Khotan and Yárkand, and in other parts of Central Asia. They live chiefly in hilly tracts, where good pasture is obtainable for their flocks, and are distinguished from other men of Central Asia by their wearing blue-and-white striped cloth, and being always armed, generally with matchlock, sword, and dagger.

While travelling over the route from Ilchí to Zilgíá and Luk, this portion of the country also appeared to me to resemble the plains of Hindostan, being a vast plain, without any mountains in sight. On leaving Zilgíá for Sanjú, I, for the first time after many days, observed the lower spurs of the Kíun Lun Range; and on nearing Sanjú, which is situated in a ravine immediately at the foot of these low hills, I almost fancied I was on the road between Futtehpoor and Mohun, at the foot of the Sewaliks. Quitting Sanjú, and proceeding to

the Kárákásh Valley, the features of the country underwent a complete change; here no level ground was to be seen, but lofty rugged mountains intersected by deep narrow ravines, especially near the Walágot Pass, where the hills are so elevated as to be covered with snow for the greater part of the year. The last portion of the route to Shádulá is particularly pleasant, being the whole way up the Kárákásh Valley, which is wide and even, and shut in on either side by rugged mountains. On this route I noticed numerous extensive plateaus near the river, covered with wood and long grass. These being within the territory of the Maharajah of Kashmir, could easily be brought under cultivation by Ladákees and others, if they could be induced and encouraged to do so by the Kashmir Government. The establishment of villages and habitations on this river would be important in many points of view, but chiefly in keeping the route open from the attacks of the Khérghiz robbers.

I reached Shádulá on the 16th of October, and was detained there no less than twenty-four days, awaiting the arrival of the coolies I had written for to Leh. This delay in the arrival of the men was caused by the miscarriage of the several letters I had forwarded to the thánedár of Ladák. During my detention at Shádulá I employed myself in ascending several peaks, both to the east and west, for the purpose of sketching the country. I also visited Khérghiz Jungle in lat. 36° 11′ 0″, and long. 77° 46′ 30″, and other places on the Kugíár route, to accomplish which I had to travel over a barren country, by the Khérghiz Jungle Pass, to the encamping-ground of that name. This place is named "Khérghiz Jungle" from the circumstance of its having been frequented formerly by Khérghiz. It is now visited occasionally by Kanjútí or Hunzá robbers. I should have extended my explorations in this direction further, but was deterred from doing so, through fear of meeting these robbers, who were reported at that time to be moving about these parts. I saw a large party of them on one occasion, at a distance of about two miles, through a telescope. The Kanjútí robbers (who are not shepherds) lie in wait for caravans at Aktág and Kulánuldí, on the Kugíár route, and carry their captives and plunder to a place called Shingshál, on the north of the Kárákoram. Their fastnesses can only be approached by troops operating against them from Aktág and Kulánuldí. Under these circumstances, and not wishing to run the risk of being taken captive and sold as a slave in Badakshan, I retraced my steps to Shádulá.

I finally quitted Shádulá for Leh on the 8th of November,

first marching up the left bank of the Kárákásh River, and then turning west up the broad and open valley called Sukit, at the head of which I crossed the Sukít Diwán Pass by an easy ascent and descent, and reached the undulating plateaus between the Sukit Diwán and Kárákoram passes. After this I crossed the Kárákoram Pass (height 18,317 ft.), also by an easy ascent and descent, and then followed down the course of the Baltí Púlú Ravine till it joined the Sheók River, on the right bank of which Gapshan is situated. The general features of the country travelled over since crossing the Sanjú Diwán are low barren hills and elevated plateaus, destitute of all vegetation and water, from the streams being frozen at this season of the year.

From Gapshan I continued to march down the right bank of the Sheók River, which joins a stream from the Sarsil, up which I ascended, and, crossing the Sarsil Pass, descended to the village of Changlúng in the well-known valley of the Níobrá River. I then proceeded down the left bank of the Níobrá River, *viâ* the villages of Pánímik and Chati, to the Sheók River, which I crossed about a mile above its junction with the Níobra stream, and next proceeded, *viâ* Khardong Village, over the pass of the same name, and descended to Leh, which place I reached on the 1st of December. This portion of country consists of high snowy ranges and deep valleys.

From Leh I marched to Kashmir by the usual road along the Indus River, *viâ* Khalatzí, Kargil, Drás, and Sonámarag, and reached Srínagar on the 19th of December. Winter having set in, this portion of the journey was disagreeable and difficult. The whole of the country between Lámá Yúrú and Srínagar was under snow; the Drás Pass was covered over with 4 feet of snow, which being fresh, rendered travelling so tedious and tiresome that my party was benighted on the pass, and nearly perished from having to sleep without covering on the snow. I and six of the natives with me suffered severely from frost bite.

After halting a few days to recruit ourselves, and to enable the party to get cured of the frost bite, I left Srínagar for Jhelum, *viâ* Bárámullá, Bágh, and Mírpur, the other routes being closed. This being a long route, and the entire country from Srínagar to Bágh being under snow, I was not able to reach Jhelum till the 28th of January. From Jhelum I marched down the Grand Trunk road to Umballa, and thence to Dehra Doon, which place the camp reached on the 28th of February, 1866.

As regards the geology of the portion of Central Asia visited

by me, my knowledge of the subject is very limited and imperfect, but I noticed the following in different parts of the country:—Between the Chángchénmo and Kárákásh valleys there are to be found clay-slate, shingle, and quartz, also conglomerates containing fossil shells on the watersheds of the three lakes mentioned in this report. Between the Kárákásh and Brinjgá, the Kíun Lun range runs almost east and west, having a greater fall on the south than on the north. Its high spurs are composed chiefly of granite, quartz, and shingle; while the low spurs of the same range, which run down almost parallel to one another to the north, consist of sandstone and hard clay; and the soil of the plains below and to the north of these spurs from Kíriá to Sanjú is a mixture of sand and clay. The country between Sanjú and Korámlákjílga is like that to the north of Brinjgá, while that between the latter place and Shádulá on the Kárákásh River is composed mostly of quartz, granite, slate, and shingle. The ground between the Sukit Diwán and Kárákoram passes, and down to Gapshan, consists chiefly of slate and shingle of various colours, conglomerate being seen in small quantities. A few fossil shells were found by me immediately below, and to the south of, the Kárákoram Pass last season.

I would mention that some of the men of the Native Establishment, viz.,—Nur Bux and Emám Allí, barkandázes, and Mátádín, lampman (the only natives of Hindostan with me), did excellent service, especially the first. I must also bear testimony to the great assistance which I received from Jumán Khán, the Turkistání interpreter, while travelling in the provinces of Central Asia. All these men, as can well be imagined, had many and trying difficulties to contend with, and I hope I may be permitted to urge their claims, and to recommend that the three men of the native establishment whom I have referred to by name be rewarded with a gratuity of six months' pay each.

My survey was based on three previously-determined Trigonometrical Stations on the Kíun Lun range, and was executed with a plane-table, which was set up on positions, mostly high hill-peaks, which are particularised in the map, from whence I sketched all the ground in view. I carried on the plane-tabling from my starting stations to Ilchí, and then round, *viâ* Sanjú, to the vicinity of the Maharajah's guard-house at Shádulá; from here to the Kárákoram Pass is a distance of six marches, or 60 miles, as the crow flies. I would willingly have carried forward my plane-tabling to the Trigonometrical stations on the Kárákoram, for the sake, not only of sketching the country, but of

verifying my work, but the winter had set in, and the intense cold rendered it impossible for me to use either pencil or brush. I nowhere attempted to take astronomical observations for longitude, but I determined the latitude of Ilchí and of Sanjú by observations to the sun and the pole star, the result of which agree with those independently obtained by the plane-table.

A trace of my plane-table sections, together with several routes in Central Asia, about which information was received when I was in that country, are herewith forwarded.

Dehra Doon, April 22, 1866.

MR. JOHNSON'S ITINERARIES. ROUTE I.—FROM LEH TO ILCHI.

Number of Marches.	Place.	Estimated Distance in Miles.	Height in feet above sea-level.	General Bearing.	REMARKS.
	Leh to—		11,345		Capital of Ladák. Well known.
1	Tikse	13	..	E.	Large village and monastery. The village is situated in a plain, on the right bank of the river Indus. The monastery is on the end of a spur, immediately to the north of the village. Encampment in a poplar garden, to the north-east of which is a small sacred tank. The whole of the land about the village is irrigated by canals from the Indus, and is subject to inundation when the river rises above its usual height.
2	Chimre	16	..	E. & N.E.	Large village and monastery. The road runs along the right bank of the Indus for a distance of 11 miles, till it reaches a large willow garden, when it turns north up the Saktí ravine, on the right side of which the village is situated, on ground ascending in steps. The monastery is erected on the knob of a spur to the west of the village. Encampment in a small garden of poplars to the east of the village.
3	Zingrul	11	..	N.E.	Encampment at a small tank, which is in a grazing-ground belonging to the villages of Chimre and Saktí. The road runs up a ravine for 6 miles, till it reaches the large village of Saktí, which is situated at the junction of two streams, up the western one of which a road leads into Níobrá, *viâ* the village of Taiñyar, while the road to Zingrul lies up that which runs down south-west from the Changlá Pass. The whole of the ground in the ravine from its junction with the Indus to the village of Satkí is well cultivated in a succession of steps. Ascent between Saktí and Zingrul very steep, being the best part of the ascent to the Changlá Pass, which renders the after ascent from Zingrul to the Changlá very easy. No houses at this place.

4	Durgú	15	..	N.E.	Small village, situated at a point on the left bank of the Chushul River, from whence three roads strike off, viz., to Taiñyar, to Sheók, and to Táñksí, and where stands a large storehouse belonging to the Maharajah. The River Chushul contains fish, principally trout, which are very good. The ground about the village is bare of trees, but is well cultivated. The road from Zingrul to Durgú is on the whole good, crossing the Changlá Pass at a distance of 4 miles, and then down a ravine which joins the Chushul River immediately below Durgú. At a distance of 7 miles from the Changlá Pass the road crosses the ravine, and passes for a mile over a spur to Durgú; the end of the spur is exceedingly steep and sandy. Stone wall embankments have been erected across the ravine above Saktí, with the object of collecting the snow in masses during the winter months. These masses remain below long after the snow on the hill-sides has melted,—an ingenious expedient for keeping up the supply of water for irrigation purposes during the summer. During the season of 1862 a glacier was crossed on the Zingrul side of the Changlá Pass which was found last year to have disappeared.
5	Táñksí	7	..	S.E.	Small village, situated on the banks of a small stream which is supposed to have once drained the Pangong Lake above its junction with the Chushul River. The village is noted for its storehouses—hides, skins, horns, and grain being kept here for the Maharajah. All coolies, provisions, &c., are taken from this place by travellers visiting the Chángchénmo, and other parts. An attempt has been made to plant out a willow garden, but on account of the intense cold during the winter the trees remain small and stunted. There are two roads leading from Durgú to Táñksí, one along the right bank of the Chushul River, and the other along the left; the latter road crosses the river by a small bridge made of willow-branches, covered with smooth slate-slabs, which, being loosely put down, render the bridge dangerous. The road on the right bank is good, and crosses the river by a ford about $1\frac{1}{2}$ mile below Táñksí. There are several roads leading from Táñksí to different parts of the country, the chief one being to Chushul south of the Pangong, and to Sherá and Igú on the banks of the Indus, *viâ* Sasákúl village.

ROUTE I.—FROM LEH TO ILCHI—*continued.*

Number of Marches.	Place.	Estimated Distance in Miles.	Height in feet above sea-level.	General Bearing.	REMARKS.
6	Sowár or Chírí..	13	..	E.	Encamped on the bank of a small lake, about 5 miles west of Pangong. Road good; slight ascent up ravine the whole way; passed Muglib village, 7 miles from Táñksí. The banks of the stream are covered with grass, affording good grazing for cattle. The wood procurable for fuel is chiefly wild lavender and tamarisk. The mountains on either side abound with wild goats (snápo). The lake contains fresh water, which, being supplied by the melting of the snow on surrounding mountains, does not reach until late in the evening, and flows for only a few hours. No houses at this place.
7	Chagrá	15	14,917	E. & N.	Encampment of shepherds. This place is situated in an open ravine, which descends from the ridge which bounds the Chángchénmo Valley on the south, and is a well-known grazing-ground; thousands of sheep and shawl-wool goats, belonging to the shepherds of the Pangong district, are kept here all the year round. The route from Sowár to Chagrá, within half a mile of the western end of the Pangong Lake, proceeds for 7 miles up the valley on which Sowár is situated, when it runs up the Chagrá ravine (the water of which flows into the Pangong Lake), passing the village of Lukam at 10 miles. Wild lavender-bushes very plentiful. Numerous fish met with in the Chagrá stream. The wild horse (kiañg) and wild goat are to be met with on the hills on either side of the valley; these animals can be hunted with ease, since most of the hills are in gentle undulating slopes, and are covered with shingle. Salt is extracted from the water of the Pangong at a distance of 14 miles east of Lukam village; this salt is used very largely.
8	Rimdí	11	..	E. & N.E.	Halted at the junction of two streams, one of which flows north from the Másimik Pass, and the other north-east, from some high snowy peaks. Rimdí is also a grazing-ground, visited occasionally by the Pangong

					shepherds. The road from Chagrá is, on the whole, very good: it lies up a ravine at a slight ascent to the Másimik Pass (18,990 feet), which is crossed at 7 miles, and then descends down the ravine to Rimdí. The ground on either side of the Másimik Pass is rather dangerous, from the earth being rendered boggy by the melting of the snow on the pass; it is necessary to have a guide from the Chagrá encampment to lead travellers over this part of the road. Kiañg, snápo, and the wild yák are to be found on the surrounding hills, of which those to the west of Rimdí are very steep and covered with snow.
9	Pamchálan ..	14	..	N.N.E.	Halted at this well-known grazing-ground, visited occasionally by the Pangong shepherds during winter: it is situated at the junction of the stream from the Másimik Pass with the Chángchénmo River. The road from Rimdí goes down the course of the Másimik stream; grass and wood are plentiful; of the latter there is a perfect jungle, chiefly of tamarisk-bushes, the wood of which is stunted, but of a good thickness. Hares are to be found in great numbers in this jungle. The ground about the Chángchénmo Valley is barren and rugged; low hills, rocky at the top, and covered with shingle of various colours, are to be seen in almost every direction.
10	Kíam	12	17,045	..	Halted at the hot springs for which the Chángchénmo Valley is celebrated. These springs are visited by Tartars of the Pangong district and of No and Rúdok: by the latter chiefly during winter. The water, the temperature of which was 179° in the month of August, has an offensive smell and taste, being impregnated with soda and sulphur. It is said to be beneficial in cases of rheumatism, &c. The ground about the spring is covered with soda to the depth of about two inches; the soda is reported to be of good quality, and is exported to Leh, &c., where it is used by the people to aid in infusing their tea. This place is situated at the end of a spur on the left bank of a stream running down west from the Képsang or No Pass into the Chángchénmo River, and at a distance of about 2 miles above their junction. The road from Pamchálan lies over flat ground, covered with sand and boulders, up the left bank of the Chángchénmo River for a distance of 9 miles, when it crosses and recrosses the river: the fording being difficult in summer from the water being cold, deep, and rapid. The fording can only

ROUTE I.—FROM LEH TO ILCHI—*continued.*

Number of Marches.	Place.	Estimated Distance in Miles.	Height in feet above sea-level.	General Bearing.	REMARKS.
					be effected at certain hours in the morning, when the water subsides partially. The Chángchénmo Valley between Pamchálan and Kíam is wide and open, but has a wild appearance. There is a general want of vegetation till the route approaches Kíam, where grass is plentiful, and lavender-bushes are to be seen on the hill-side to the south of the springs. This part of the country abounds with wild antelope, kiañg, and yák. A few hares and marmots are also to be found.
11	Lúmkáng	18	17,501	N.E.E.	Halted in an open ravine 4 miles south of the pass of the same name, and at the foot of the range of mountains bounding the Chángchénmo Valley on the north. Road crossed the stream immediately to the north of the hot springs, and then over a low spur at 8 miles, from whence it runs up the Lúmkáng ravine, which joins the one from the Képsang Pass about 3 miles above Kíam. A small quantity of grass and wild lavender found here. Tibetian antelope very numerous.
12	Nischú	20	17,680	N.	Halted at the junction of the stream which flows down north from the Lúmkáng Pass with one that runs down from the west. Road good: for a distance of 8 miles, to the top of the Lúmkáng Pass (19,533 feet), it lay up a gradual ascent, and then descended gently down the ravine to Nischú. There was no snow on the Lúmkáng Pass at the time of crossing. The ravine in which Nischú is situated is small, and confined by low spurs from the northern Chángchénmo ridge; lavender is found here in small quantities, but no grass.
13	Burcháthang ..	18	17,425	N.	Halted near a small stream which flows down from the south. No wood or grass met with. Road good, running down left bank of the stream, from Nischú, for a distance of 8 miles, where it leaves the stream and crosses several very low and broad spurs, going over dry bed of a small lake, and, passing a low spur, descends by a sandy ravine to this place.

14	Tsothang	20	17,024	N.	Halted near a small salt-water lake; road good the whole way, being over a plain which has the appearance of having been the bed of a large lake; the soil was covered with saltpetre to the depth of about 6 inches. While on the route no hills were observed in an easterly direction. No grass, but a little wild lavender, to be obtained immediately to the north of the lake, the water of which is brackish. A few Tibetian antelope were seen: these animals seem to live chiefly on the lavender-plant.
15	Huzákhar	15	16,684	N.	Halted about 20 yards to the east of a small lake, which is difficult of discovery, from its being in a deep hollow in a plain. The water of the lake is brackish, but a small spring of fresh water flows out of the high bank into the lake. The road, on leaving previous encampment, lay for a mile up a gentle ascent, to the height of about 200 feet, and then descended gradually for about 6 miles; the fall on the northern side being much greater than that on the southern. This small ridge separates the dry bed of the lake crossed on previous stage from a similar one to the north. When on the ridge, a traveller almost imagines he is out of the hills altogether, from the circumstance of the extent of plain country preponderating greatly over the hilly. The whole country, with the exception of that to the west, where the hills rise to a greater height, has the appearance of having been the beds of very large lakes of various levels, and seems to be subject at the present time to inundation in the months of April and May, during which period the snow melts on the hills.
16	Mápothang	16	15,959	N.	Halted immediately to the south of a small salt-water lake, which is situated at the foot of a spur of a hill, and at the southern end of the second great plain travelled over. The road, for a distance of 12 miles, lay down a broad sandy ravine, and then turned up a spur to the left, and descended to this place, where there is no wood or grass. The water in the lake is brackish.
17	Yangpá	25	15,279	N.	Halted on the left bank of a small stream, the water of which is slightly brackish, though it flows down from the Kíun Lun range, which is to the north. Route lay over an extensive plain covered with several lakes, the water being exceedingly brackish, and having a very offensive smell. The

ROUTE I.—FROM LEH TO ILCHI—*continued.*

Number of Marches.	Place.	Estimated Distance in Miles.	Height in feet above sea-level.	General Bearing.	REMARKS.
					plain seems to have been a very large lake, judging from the water-marks to be seen on the low sandy spurs which are met with just before getting to this place, and the quantity of saltpetre which lies on the ground to the depth of about 9 inches, which is so white that, on looking down from a height, the whole plain has the appearance of being covered with snow. Wild lavender and grass to be had here in very small quantities.
18	Kárákásh	18	15,491	N.	Halted on the left bank of the Kárákásh River, at a distance of about 20 miles from its source in the Kíun Lun range, which lies immediately to the north and east; the river flows west from this point for about 60 miles, and then turns to the north-east. A few stone huts have been erected on the right bank of the stream by Jumá Kháñ, ambassador from Khotan to the British Government. Route lay up a sandy ravine to the Khatáí Diwán Pass (height, 17,501 ft.) for a distance of 8 miles, then over a dry bed of a large lake (the third met with), and descended by a very abrupt fall to the river. Judging from the water-marks which exist, this lake appears to have once drained into the Kárákásh River. There is a good road from this place along the left bank of the Kárákásh River to Shádulá, situated on the route between the Kárákoram Pass and Yárkand. Large quantities of lavender and a little grass to be found here.
19	Tásh	19	15,583	N.E.	Halted at a stone hut erected by Jumá Kháñ on the left bank of the Yangpá River. Lavender to be had here. On leaving the Kárákásh the road lay up a ravine to the Yangí Diwán Pass (height, 19,092 ft.), the ascent to which was steep and difficult, on account of there being a large quantity of ice and snow in the ravine and on the pass. After crossing the pass the road runs down a ravine to this place. The bed of the Yangpá River is a gold-field, and was much frequented about three years ago by Khotan

					people, for the purpose of digging for gold. On reaching the top of the Yangí Diwán Pass I was surprised to notice the great change in the general features of the country, which to the north is rugged and broken, resembling the southern Himalayas, while on the south it is almost a plain. The Yangí Diwán Pass can only be crossed during the months of June, July and August. It is reported that this route was discovered and used for the first time by Jumá Kháñ.
20	Khushlash langar	13	15,048	N.	Halted near a stone hut, situated near the junction of the Yangpá River with a large stream which flows down north-east from the Naiá Kháñ Diwán Pass. The road is steep and bad, from its being down the rocky bed of the Yangpá River. No wood or grass obtainable.
21	Brinjgá	22	11,755	N.	Halted near some underground huts occupied by shepherds from Khotan, in charge of cattle belonging to the king. This is a famous grazing-ground, the grass growing to a height of two to three feet. The hill-sides are covered with the wild senna-plant, which is used as a medicine by the people of Central Asia. Wild goats (snápo) and large chikoor are found here in large numbers. The road from Khushlash langar to this place was bad; for half the distance it ran up a rocky ravine, and crossed over a large glacier and the Naiá Kháñ Diwán Pass (height, 18,659 ft.), the ascent to which is very steep. After crossing the pass, it ran over a small glacier, and descended very abruptly to Brinjgá. The passes—viz., the Yangí Diwán and the Naiá Kháñ Diwán—are in the Kíun Lun range of mountains, which are for the most part very rugged and steep, and are composed chiefly of loose shingle, with granite rocks above.
22	Kapás	10	10,653	N.W.	Halted at a stone hut on the right bank of the Brinjgá River. The road is particularly rocky and dangerous, from passing over a succession of steep and rugged lateral spurs running down into the river from two high ranges on either side, the bed of the stream is therefore very contracted. Large quantities of coarse grass and reeds found here.
23	Kárangoták ..	16	8,735	N.	Village of about 500 houses, which are chiefly occupied by convicts and exiles from the cities of Káshgár, Yárkand and Khotan. The road for the

ROUTE I.—FROM LEH TO ILCHI—*continued.*

Number of Marches.	Place.	Estimated Distance in Miles.	Height in feet above sea-level.	General Bearing.	REMARKS.
					first portion is very rocky, lying down the Brinjgá River. Poplars and other trees are very numerous; cultivation is carried on, but not to a large extent. This place is situated on some flat ground on the right bank of a large mountain torrent which flows from a snowy ridge to the west, and is noted for the "yashm," a description of agate stone, prized by the Chinese, and which is met with in the stream. The inhabitants of this village are particularly uncivil to travellers, and show disrespect even to the officials of the country. The convicts are known by their beards being kept shaved, and their faces branded with round marks.
24	Píshá	15	8,643	N.	Village of about 20 houses, situated in a broad ravine running from the east, with only a small stream of brackish water in it. There are no trees about the place, but a good deal of wheat and barley cultivation in the flat ground on either side of the stream. The road on leaving Kárangoták crosses by a wooden bridge the Khotan River, which flows from the Kíun Lun range, and is very deep and rapid. After passing over a very steep ascent, the road goes over extensive grassy slopes inclining northwards, and descends gently to the village. No water to be had on the route. It is reported that a large quantity of salt is extracted from the water at this place, and exported into Khotan.
25	Búíá	10	7,692	N.	Village of about 100 houses, situated on a ravine very like that of the Píshá. No trees, and only a little cultivation. This place is also a well-known grazing-ground; thousands of sheep and goats belonging to Khotan are kept here. Road very good, passing over several low spurs composed mostly of clay and sandstone. The portion of country travelled over between Kárangoták and Búíá has the appearance of having been the bed of a lake.

26	Yangí langar ..	29	5,930	N.	Village of about 30 houses, situated on a patch of flat ground on the right bank of the Sirísú stream, which contains but little water, and rises in the low hills to the south-east. The road crossed a low sandstone ridge, running east and west, by the Bíshá Diwán Pass (height, 10,408 ft.), and then down the rocky bed of the Sirísú stream to Yangí langar. The ascents and descents of the Bíshá Diwán Pass are steep, and the bed of the river is full of large rocks, which makes the journey very troublesome. A few fruit-trees and cultivation at this place, which originally was a post or guard-house of the Chinese.
27	Kúmát langar ..	5	5,795	N.W.	Village containing 150 houses, situated on the right bank of the Sirísú stream, and at the foot of the last low range of hills to be seen in the direction of Khotan. Road good, along the flat ground on the right bank of the stream. On reaching Kúmát langar the ground resembles the Sewaliks, at the entrance to the Mohan Pass, the country to the north being a vast plain.
28	Bezilíá	10	4,678	N.W.	Village containing 1000 houses and a small bazar. It is situated in the plains, at a distance of 3 miles in a north-easterly direction from the Khotan River, the water of which is brought down in canals, for the purposes of irrigation. The whole of the ground for miles round this village is well cultivated, and in many parts is wooded with fruit-trees of various descriptions. Road lies over a sandy soil, till within 2 miles of the village.
29	Ilchí	11	4,329	N.W.	Capital of Khotan; a large town. It is on the left bank of the large river named after the province. The road passes the whole way through gardens, cultivation, and small villages, until it approaches Urangkásh, when it follows the great street of the bazar, crosses the Khotan River, and leads into Ilchí. The Khotan River is forded in three streams, which is a difficult undertaking when the river is high, as the water is then very deep and rapid. On arriving at Ilchí, a traveller feels as if he had left the hills altogether, and was in the plains of Hindustan, especially when he looks around him and sees no hills in any direction, excepting on clear days, when the lower ranges of the Kíun Lun are visible. The city of

ROUTE I.—FROM LEH TO ILCHI—*continued.*

Number of Marches.	Place.	Estimated Distance in Miles.	Height in feet above sea-level.	General Bearing.	REMARKS.
					Ilchí contains about 40,000 inhabitants, most of whom are men of the country; the only strangers being Kashmirees and Cabulees, who are few in number, and chiefly traders. It is a well-known manufacturing town, and celebrated for its rich carpets, felts, and cloth; also for raw silk, which is very extensively cultivated in the gardens round the city, and in the neighbouring villages. The bazar of Ilchí, where a fair is held every Thursday, is situated to the west of the old Chinese mud fort, and consists of a long street running east and west, with four lateral ones—the principal street being covered in with a roof of reed matting. The Kháñ of Khotan has shown some enlightenment (the result of personal observation when travelling through India in 1862) in the way in which he has laid out his military cantonment, which is to the east of the fort. The lines for cavalry, infantry and artillery are separate from one another, with distinct parade-grounds. The town of Khotan, the Chinese fort, and the cantonments are all embraced within a fortified wall, about 9 miles in circumference.

ROUTE II.—FROM ILCHI TO LEH, VIA THE KARAKORAM PASS.

	Ilchí to—				
1	Jábá	21	4,124	W.	Village of about 300 houses, situated on the right bank of a branch of the Kárákásh River; this village is called old Jábá. The new village, containing about 1500 houses, is situated on the left bank of the above river, and is surrounded by a fortified wall, similar to the one round Ilchí. The

					road from Ilchí to Jábá passes through a well-cultivated country, resembling a garden, till it reaches the Kárákásh River, which is here divided into several streams, all of which are crossed by wooden bridges. Passed numerous small villages on the route, also Dúshambá bazar, at a distance of about 8 miles from Ilchí. The main street of this bazar, in which a fair is held every Wednesday, is about a quarter of a mile in length, and runs from east to west; it is covered in with matting like the one in the Ilchí bazar.
2	Píálmá	26	4,342	W.	Village of 1000 houses, situated in a well-cultivated plain, and dotted with fruit-trees. On leaving the village of old Jábá, the route, after crossing a branch of the Kárákásh River called Siriksú, by a wooden bridge, passes through the fortified village of the same name, and then over a sandy plain, along which small post or rest houses are met with at intervals of 3 miles, to Píálmá. The battle of Píálmá was fought on this plain in April, 1864, between the Khotanees and Andajánees, or Khokánees, about 3 miles east of Píálmá. Numerous tombs mark the site of the battle-field, which is partly covered with long reeds and bushes. In this battle it is reported that 70,000 men were engaged on either side; that the Khotanees were the victors, and they captured 60 guns, 2500 prisoners, the camp and baggage of the enemy, including 600 camels, 2000 horses, and 1500 donkeys. I noticed a boat on the branch Siriksú of the Kárákásh River near Jábá. It was construeted of poplar, and built by Kashmirees. It was twenty feet long, by twelve wide, and was flat-bottomed. Immediately to the west of new Jábá, is a chain of posts, or guard-houses, of the Chinese, running north and south. These post-houses extend from the hills to the south, to Aksú to the north, and are at intervals of ½ a mile; they defined the boundary line between the provinces of Yárkand and Khotan during the time of the Chinese rule, and were still such, until the battle of Píálmá, when the Kháñ of Khotan advanced his boundary line to the town of Gúmá.
3	Zilgíá or Zelingíá	17	4,396	W.	Village of about 1500 houses, fortified in the same manner as Jábá. The village is situated in an open plain, near a small stream, which flows down from the spurs of the Kíun Lun range to the south. There is a good deal

ROUTE II.—FROM ILCHI TO LEH, VIA THE KARAKORAM PASS—*continued.*

Number of Marches.	Place.	Estimated Distance in Miles.	Height in feet above sea-level.	General Bearing.	REMARKS.
					of cultivation about the village, also fruit-trees. The route from Píálmá to this place lies over a sandy plain, sloping gently from south to north, in which three post-houses are met with at intervals of 5 miles. The water at these resting-places is exceedingly brackish, and is used by the natives of the country in preparing their food in lieu of salt.
4	Sanjú	23	6,134	W. & S.W.	A large but scattered village, containing about 7000 houses, situated immediately below the first low hills to the south in an open ravine, which comes down from a high range running east and west, and separates this portion of the country from that drained by the Kárákásh River. Sanjú, with its encampments of Khérghiz shepherds, &c., is considered a parganá, and was subject to Yárkand until my visit to Khotan, when Rogí, the beg, or governor, accompanied by the begs of Zilgíá and Gúmá, came to Khotan, and agreed to transfer their respective parganás to the Kháñ of Khotan. The road from Zilgíá lies over a sandy plain, sloping from south to north, void of vegetation for a distance of about 17 miles, when it advances down a steep descent of about 300 feet to the ravine in which Sanjú is situated. Extensive cultivation of wheat, barley and Indian corn is met with here, and numerous fruit-trees, and small vegetable gardens containing turnips, radishes, onions, spinach, &c.
5	Kivis	11	6,761	S.	Village of 5 houses, inhabited by shepherds (not Khérghiz) of Sanjú. There being good grazing-ground about this place, large flocks of sheep and yáks from Sanjú are sent here.
6	Pátí	8	7,199	S.	Situated on the Sanjú ravine, and sometimes used by travellers as a halting-place; there are no huts, &c., here. Bushes of willow and tamarisk very numerous along the banks of the stream. The road from Kivis was very bad, and the route rendered difficult owing to the ravine up which it runs being very confined, and the necessity of fording the stream very frequently, the bed being full of large boulders.

7	Korámlákjilgá ..	14	10,239	s.	A Khérghiz encampment and grazing-ground, situated near the junction of some small streams which are the source of the Sanjú River, and about 8 miles to the north of a snowy range, which is the watershed of the Kárákásh River on its western side. The ground about the place is covered with short, fine grass, which is said to afford good pasture to the flat-tailed sheep and yáks of the Khérghiz shepherds, who are found here in large numbers all the year round. These Khérghiz are quite independent, and are reported to be great robbers. During the time of the Chinese, they always kept a guard of 50 men at this place, to prevent the natives leaving the country, and to keep strangers from entering it, without due authority from the Kháñ Ambán of Yárkand. Numerous chikoor are met with at this place.
8	Zakoñgrá	18	10,210	s.	Halting-ground used by travellers and caravans on their way from Yárkand to Ladák, and by Khérghiz shepherds. The road from Korámlákjilgá lies for a distance of 2 miles over the grassy slope of a ravine, after which up a steep ascent to the Walágót or Sanjú Pass (height, 16,763 feet), and then descends down a ravine to this place, which is situated on the right bank of a stream which flows down from the range which is the watershed of the Kárákásh River on the south and drains into that river. The road over the Walágót Pass is steep and rocky, and dangerous at the time I crossed, from the circumstance of fresh snow having fallen, and which partially closed the holes and crevices in the rocks. The road at the top of the pass for about 60 feet on either side runs over solid rock.
9	Pílátargásh	22	10,905	s.	Khérghiz encampment situated on the left bank of the Kárákásh River, which flows through a broad valley. The road from Zakoñgrá to Pílátargásh is good; it lies down the stream, on which the latter place is situated, for a distance of 10 miles, till its junction with the Kárákásh River, and then proceeds up the left bank of this river to the encampment. The whole of the country on this march is a grazing-ground, used by the Khérghiz shepherds, who were very numerous, until partially destroyed by Mirzá Abúkákar, a chief of Badakshán, who is reported to have invaded this part of the country about 60 years ago, to punish the Khérghiz for their

ROUTE II.—FROM ILCHI TO LEH, VIA THE KARAKORAM PASS—*continued.*

Number of Marches.	Place.	Estimated Distance in Miles.	Height in feet above sea-level.	General Bearing.	REMARKS.
					depredations on the Yárkand caravans. The ruins of two forts, said to have been erected by Abúkákar, still exist, one of which, Ilnagar (height, 10,665 ft.), is at the junction of the Zakoñgrá ravine with the Kárákásh, and the other at a point from whence a road branches off to Yárkand from the Sanjú route. This road is not well known, but it is reported to be occasionally used by foot passengers.
10	Oibuk	26	10,715	s.	Halted near an encampment of Khérghiz, on the left bank of the Kárákásh River. This place is also used as a grazing-ground by the Khérghiz, and by the traders from Leh, on account of the long grass, which affords such good pasture for the horses of the latter as to induce them to halt here several days to recruit their animals after the difficult journey over the Kárákoram Pass. It is reported that the land about this place had been cultivated at some previous period by the followers of Mirzá Abúkákar, and which appeared to me evident, from the land being laid out in steps, resembling the fields on the banks of the Indus near Leh. The road from last encampment was very good, being along the left bank of the Kárákásh River. It passes the ruins of an old fort named Mirzá Abúkákar, after the invader from Badakshán, and which is situated at a point from whence a road leads to Yárkand. This road runs up a ravine for two marches, and then crosses the Kalíán Pass, which is situated about 30 miles to the south-west of the Walágót Pass, and on the same range, and proceeds down a ravine to Yárkand, *viâ* Kalíán village, at which place the Chinese always kept a guard of 50 men to prevent strangers from entering the country by this route, which is one of the three principal ones to Yárkand from Leh, but is not used in winter, owing to the pass being a high one. A horseman, it is said, can reach Yárkand from this place on the sixth day.

11	Shádulá	6	11,509	s.	Encampment near a guard-house, belonging to the Maharajah of Kashmir, who had a guard of 25 sepoys and 50 Tartars at this place, to protect the káfilás or caravans from Hunzá and Khérghiz robbers while passing through this portion of the country. Shádulá is situated on the left bank of the Kárákásh River, which flows from this to Ilnagar fort, through a broad and open valley, called Súrikhiá, from the soil of the country being of a red colour. Brushwood and grass are to be had in large quantities along this route. A road leads from Shádulá to Khérghiz jungle, situated on the Kugiár route from Leh to Yárkand. Leaving Shádulá, it runs west up a ravine, crosses the Khérghiz Jungle Pass (height, 16,795 ft.), which is on the same ridge as the Walágot and Kalián ones), and descends a ravine to Khérghiz jungle (height, 10,978 ft.). This route is very easy; laden camels were brought over when I was at Shádulá. It is not much frequented by traders, on account of its being dangerous from the Hunzá robbers, who are reported to frequent the country about Khérghiz jungle, and also the Khérghiz who are to be met with on the second march from Shádulá It is chiefly used by traders from Yárkand to Leh proceeding by the Kugiár route, as a means of escaping from being taken captives by these robbers, after their goods have been plundered. These traders, as a general rule, abandon their horses, goods, &c., on the appearance of danger. The general appearance of the country is bare and rocky, like that about the river Indus at Leh, with the exception of the hills being somewhat lower and there being less snow on them.
12	Sukit	29	13,499	s.	Halted at a place where the last patch of grass is to be found in the valley called Sukit, and about 6 miles west of the pass of the same name. This valley is a grazing-ground much used by traders from Leh to Yárkand, as as it is the first at which grass and wood are obtainable after leaving Níobrá, and travelling over the barren ground about the Kárákoram for 8 days. The route lay up the left bank of the Kárákásh River for 8 miles, to the point at which that river turns east, and then up the right branch of the Sukit stream, which rises in the ridge which is the western water-shed of the Kárákásh River.

ROUTE II.—FROM ILCHI TO LEH, VIA THE KARAKORAM PASS—*continued.*

Number of Marches.	Place.	Estimated Distance in Miles.	Height in feet above sea-level.	General Bearing.	REMARKS.
13	Malakshá	30	16,475	S.W.	Halted at a spot used as an encamping-ground by caravans, situated on the left bank of a stream which flows down from the east, and is the source of the Kugíár River, which, after joining others, runs down to Yárkand. The Kugíár road from the Kárákoram Pass to Yárkand starts from this place, and follows the course of the above stream, passing the grazing-grounds of Khérghiz jungle, after which it crosses a low spur of the Kalián range by the Kugíár Pass to the village of the same name, and thence to Yárkand. The road from Sukit runs up a ravine, at a slight ascent, for 9 miles to the Sukit diwán Pass (height, 18,227 ft.), and then down a similar descent to Malakshá, passing an encamping-ground called Chibrá (height, 16,489 ft.), situated about 12 miles east of the Sukit Pass. I noticed some old ruins of mud huts at Chibrá, which I was informed were built, as stables, by a chief of Yárkand, who, with a party of horsemen, many years ago entered the Níobrá Valley, and plundered the Tartar inhabitants who were subject to the Rájá of Leh. No wood or grass to be had at Malakshá; water is likewise not obtainable from the end of October to end of April, in consequence of the streams being thickly frozen over.
14	Baltí Bráñsá ..	33	17,578	S.	Halted under a rock used as a place of shelter by travellers, situated on the left of the sandy ravine which comes down from the Kárákoram Pass to the south. The route from Malakshá lay for 8 miles over the end of a lower spur running down from the east, and then up the stream which comes down from the Kárákoram. The encamping-grounds of Diblá Shérgol, and Chájoshjilgá (height, 15,963), were passed at 16 and 23 miles; at the former place a little grass was seen. By proceeding north across the hills from Dibla Shérgol, the Kárákásh River may be reached in four days.

15	Baltí Púlú	22	16,167	S.W. & S.	Encamped near three small stone huts which are situated about 10 miles S.E. of the Kárákoram Pass, and near the junction of the stream from that pass with one that flows down from the west; no water, wood, or grass could be obtained here. The route ran up a broad open ravine to the Kárákoram Pass (height, 18,317), the ascent to which is easy, and then down a similar one to Baltí Púlú. The general features of the country since leaving Sukit are low barren hills and plains. Though the ground travelled over was almost a plain, still this part of my journey was very difficult, owing to the country being under snow.
16	Gapshan	17	..	S.E.	Halted at a small stone hut situated on the right bank of the Sheók River, where wood and grass are to be had in small quantities. The road lay down the Baltí Púlú stream, till its junction with the Sheók, which flows down from the great Kárákoram range to the west, and, after crossing this river, follows its course along the right bank. The Sheók River, at the time of crossing it, was only eight feet wide, and frozen over.
17	Sarsil or Sasir ..	22	..	S.E.	Stone house erected last season by the Maharajah of Kashmir, situated on the left bank of a stream which flows down from the Sarsil Pass, with a little wood and grass on either side of it. The route from Gapshan passes some large glaciers, and lies down the right bank of the Sheók River, till its junction with the above-mentioned stream, whence it ascends to Sarsil. This route travelled over by me from Baltí Púlú is called the "Khumádán," and can only be used in winter, when the water in the river is frozen. There is another route from Baltí Púlú to Sarsil from the Depsang Plains, but it is only used in summer, on account of the cold in these plains being very severe in winter. Numerous snápo (wild goat) were seen near the encamping-ground.
18	Tútiálák	12	..	S.	Encamped near some huts occupied by shepherds from Níobrá during the summer, and situated on the left bank of the stream of the same name, which comes down from the Sarsil Pass, and from which the encamping or grazing ground is 9 miles to the south. The road over the Sarsil Pass was difficult, owing to late heavy falls of snow partially closing the fissures

ROUTE II.—FROM ILCHI TO LEH, VIA THE KARAKORAM PASS—*continued.*

Number of Marches.	Place.	Estimated Distance in Miles.	Height in feet above sea-level.	General Bearing.	REMARKS.
					in the glaciers, which are met with on the pass, and thereby rendering travelling dangerous. The Sarsil Pass is in the high snowy range of mountains which separates the Sheók from the Níobrá River.
19	Changlúng	9	..	S.S.W.	Village in the Níobrá Valley, in the Ladák district. The road led down the Tútíálák ravine for 6 miles, then crossed a low spur, and descended to the village, which is celebrated for its hot springs.
20	Pánímik	8	..	S.W.	Village in Níobrá (district Ladák); this place is also well known for its hot springs.
21	Tagar	21	..	S.	Village in Níobrá (district Ladák). River frozen.
22	Chatí	7	10,674	S.E.	Do. Do.
23	Khardong	10	..	S.E.	Do., situated immediately below, and to the north of, the pass leading into Leh from Níobrá. The road lay up a ravine after crossing the Níobrá River, which was about 20 yards wide, but frozen over.
24	Leh	22	..	S.W.	Do., crossed the Khardong Pass (height about 18,000 feet), on which there was 3 feet of fresh snow.

	Ilchí to—	..	..	..	Described in Route No. I.
1	Dúl	14	..	E.	Village of 50 houses, situated below the end of a long spur from the Kíun Lun range. The road for the first part was that pursued by me on my way to Ilchí from Bezilíá, as far as Urangkásh bazar (height 4121 feet), after which it left that route and turned to the left, passing through cultivation and fruit-gardens the whole way to Dúl. Irrigation is carried on at Dúl by the canals which pass through the ground about Bezilíá.
2	Chírá	19	4,538	S.E.	Bazar and town, containing about 8000 houses, is situated about 4 miles to the west of the river of the same name. The country travelled through to-day was like that between Ilchí and Dúl. A fair is held in the bazar on every Tuesday, in which most of the articles manufactured in Ilchí are bartered for gold, which is mostly brought down from the mines to the east of Kíríá, though small quantities are worked in the river near this place. On the route, I noticed that the desert of Taklá Makán skirted the vegetation, at a distance of about 3 miles, all along on the north.
3	Kárákar	16	..	S.E.	Village of 60 houses, situated between the Chírá and Kíríá rivers. The road from Chírá to this place was lined with cultivation, &c., which is watered by canals from the Chírá River. This small river was forded about 7 miles east of the above-mentioned place.
4	Kíríá	20	4,755	N.E.	Town and bazar, containing about 7000 houses, is situated on the right bank of the river of the same name, and at a distance of 9 miles above its junction with the Chírá stream. This place, like Chírá, is surrounded with cultivation and gardens. In the bazar, which resembles that of Ilchí, a fair is held on every Sunday, when the chief trade consists in bartering the cloth, carpets, &c., manufactured in Ilchí, for gold, which is brought down in large quantities from the mines to the east of this place. Kíríá is much frequented by Kashmirees and Cabulees for the purpose of purchasing gold, which is reported to be cheaper and of a better quality at this mart

ROUTE III.—FROM ILCHI TO KIRIA—*continued.*

Number of Marches.	Place.	Estimated Distance in Miles.	Height in feet above sea-level.	General Bearing.	REMARKS.
					than at any other. The road from Kárákar lay over a sandy plain, till it crossed the Kíríá River, after which it passed through well-cultivated fields, &c. The Kíríá River, which rises in the eastern portion of the Kíun Lun range of mountains, and flows north, is crossed by a wooden bridge when the water is low, but is forded in three streams in the summer months, the temporary bridges being carried away every season by the rises in the river, occasioned by the melting of the snow in the mountains. Here, as at Chírá, the Taklá Makán desert is to be seen at a distance of 3 miles to the north. Its general appearance is that of a barren range of low hills. The soil and features of the country about Kíríá are very like those of the ground about Ilchí. Only last season a new route was discovered from Kíríá to Leh, *viâ* Polú village, which is situated about 14 miles south-east of this place, and higher up the Kíríá River. It is reported a horseman can get from Ilchí to Leh by this route in 14 marches.

ROUTE IV.—FROM ZILGIA TO YARKAND.

	Zilgíá to—	..	..	..	Described in Route No. II.
1	Múnjí	14	4,464	W.	Village of about 60 houses, situated on a small stream which comes down from the Sanjú River; some cultivation and a few fruit-trees are to be seen. The road from Zilgíá lays over a barren plain the whole way.
2	Gúmá	16	4,229	W.	Small town, situated on the Sanjú River, and about 30 miles north of Sanjú village; contains a bazar, where a fair is held every Monday, and about 6000 houses, all of which are enclosed by a fortified wall, like that round

					Ilchí. A force of 800 cavalry and 4 guns, belonging to the Kháñ of Khotan, is located in this place, as a check against any sudden attack from the people of Yárkand. Gúmá is celebrated for the superior charas, which is produced in large quantities. The bazar is small, and similar to the one at Ilchí. I was informed that this was a great mart between Yárkand and Khotan before the late disturbances, since which trade has been at a standstill, on account of the Yárkandees being prevented by the invading Khokanees from visiting this place. The only persons that carry on a little trade are the Kashmirees, of whom there are only a few in the bazar. Extensive cultivations of grain of various kinds is carried on, both inside and outside the fortified wall. The road from Múnjí lies over a barren plain, void of vegetation, with the exception of a few fields about the village of Chutar, which is 9 miles from Múnjí.
3	Luk	26	4,182	W.	Village of about 100 houses, situated on a small stream which flows from the south; extensive cultivation about the place; also a few fruit-trees. The village belongs to Yárkand. The road from Gúmá lies over a sandy plain, in which stunted tamarisk-bushes were met with occasionally. The small village of Chúlák, consisting of 6 houses, was passed at 12 miles.
4	Kargalik	6	4,118	W.	Town and bazar belonging to Yárkand. Kargalik is situated at the point where the various routes from Leh and Ilchí to Yárkand unite.
5	Ekshambá	12	..	W.	Bazar.
6	Poshgáoñ	6	..	W.	Town and bazar.
7	Yárkand	12	..	W.	City. Yárkand River to be crossed about a mile to the south of the city. Yárkand is reported to contain about 120,000 inhabitants, composed of natives of Khokán, Badakshán, Kuchár, Cabul, Baltistán, and a few Hindostanees. The city is divided into three portions, viz.: the Mahomedan town, Chinese town, and Chinese fort and cantonment. Mahomedans were not permitted to enter the two latter during the time of the Chinese.

Derived from Native information.

ROUTE V.—SANJU TO KARGALIK (DERIVED FROM NATIVE INFORMATION).

Number of Marches.	Place.	Estimated Distance in Miles.	Remarks.
	Sanjú to—		
1	Búrá	48	Pass Bitorgák and Kushtíák villages.
2	Kargalik	19	Town.

ROUTE VI.—SANJU TO KARGALIK, VIA KALIAN (FROM NATIVE INFORMATION).

	Sanjú to—		
1	Kalián	40	Village.
2	Búríá	17	Do.
3	Bísharák	17	Do.
4	Kargalik	18	Town.

ROUTE VII.—KIRIA TO CHACHAN AND LOB (FROM NATIVE INFORMATION).

	Kíríá to—		
1	Usalún langar ..	16	A post-house.
2	Nia	17	Village, 50 houses.
3	Kumrábád langar	16	10 houses.
4	Khadálák	20	Encampment and gold mine.
5	Akmárán	17	Do. do.
6	Kukmárán ..	16	Do. do.
7	Egar	19	Do. do., and well.
8	Chákálák	17	Grazing-ground.
9	Cháchan	16	Village, 500 houses, and cultivation.
10	Encampment ..	20	Shepherds' tents.
11	Do. ..	21	Do.
12	Do. ..	18	Do.
13	Do. ..	17	Do.
14	Do. ..	19	Do.
15	Lob	20	Village and lake (large, with fish in it.)

ROUTE VIII.—ILCHI TO SHADULA, VIA THE HINDO TAK DIWAN PASS (FROM NATIVE INFORMATION).

Number of Marches.	Place.	Estimated Distance in Miles.	Remarks.
	Ilchí to—		
1	Largong	15	Village.
2	Papúá	16	Do.
3	Olgíá	15	Do.
4	Mitak	15	Shepherd encampment
5	Chách	16	Village.
6	Nissá	19	Do.
7	Karáz	12	Shepherd encampment.
8	Pushíá	16	Khérghiz encampment.
9	Mazár	16	Do.
10	Halting-ground	24	Right bank of Kárákásh River; after crossing the Hindo ták diwán Pass.
11	Do.	20	Left do., do.
12	Do.	24	Left do., do.
13	Shádulá	28	*Vide* Route No. II.

ROUTE IX.—MALAKSHA TO KARGALIK (FROM NATIVE INFORMATION).

	Malakshá to—		*Vide* Route No. II.
1	Káfálúng	18	Encamping-ground.
2	Imbulgár	18	Do.
3	Khérghiz jungle	24	Do.
4	Yangí diwán ..	12	Do.
5	Tûrígil	12	Do.
6	Dóbá	15	Cultivation.
7	Túálák	30	Do.
8	Ak Masíd	22	Encampment of shepherds; crossed Tofá diwán Pass.
9	Kugíár	18	Village and pargana.
10	Beshtúrák	15	Village.
11	Kargalik	14	Town.

ROUTE X.—ABUKAKAR FORT TO KALIAN (FROM NATIVE INFORMATION).

Number of Marches.	Place.	Estimated Distance in Miles.	REMARKS.
	Abúkákar Fort to—		*Vide* Route No. II.
1	Dúra	12	Encamping-ground of Khérghiz.
2	Bostán	13	Do. Cross Kalían Pass.
3	Chadartásh ..	16	Do.
4	Katáí Tám ..	9	3 towers and post-house.
5	Upálák	20	Village.
6	Kalían	25	Village and pargana.

ROUTE XI.—YARKAND TO AKSU (FROM NATIVE INFORMATION).

	Yárkand to—		
1	Achtákú	10	Village.
2	Lailák	14	Do.
3	Mainák	14	Do.
4	Alagák	12	Do.
5	Akmarálá	16	Do.
6	Shímál	14	Village.
7	Lál Masíd	15	Small town.
8	Chárwásh	13	Village.
9	Tanshoká	17	Do.
10	Chadarkúl ..	14	Do.
11	Yákákodák ..	12	Do.
12	Sogat	12	Do.
13	Chalán	10	Do.
14	Saiortáng	12	Post-house.
15	Kumbásh	10	Village on the high road from Yárkand to Pekin.
16	Aksú	10	Town and fort.

ROUTE XII.—YARKAND TO KASHGAR (FROM NATIVE INFORMATION).

Number of Marches.	Place.	Estimated Distance in Miles.	REMARKS.
	Yárkand to—		
1	Kúkarábád ..	19	Small town.
2	Kizil	18	Do.
3	Yangísháhar ..	18	Large town.
4	Káshgár	18	City and fort. Káshgár was a small province of China till the late rebellion, when it became independent, and has since been governed by a person called Khojá (saint). The city, which is situated on the road from Yárkand to Khokán, is said to contain 30,000 inhabitants, and is much frequented by Khérghiz shepherds from the hills to the west. The fort is reported to be a strong one, and the Chinese are said to have held the place against the Mahomedans for thirteen months after Yárkand was surrendered.

ORTHOGRAPHY OF NATIVE NAMES AND WORDS.

The following rules have been observed in spelling the native names and words which occur in the foregoing papers, except in the cases of well-known places, whose orthography, as established by custom, has been adhered to :—

The first vowel sound in	*mama*	will be indicated by	*a.*
The second ,,	,,	,,	*á.*
The vowel sound in	*say*	,,	*e.*
,, ,,	*den*	,,	*é.*
,, ,,	*bit*	,,	*i.*
,, ,,	*deep*	,,	*í.*
,, ,,	*hope*	,,	*o.*
,, ,,	*cot*	,,	*ó.*
,, ,,	*full*	,,	*u.*
,, ,,	*rule*	,,	*ú.*
,, ,,	*fume*	,,	*ű.*
,, ,,	*ripe*	,,	*ai.*
,, ,,	*foul*	,,	*ou.*
The nasal sound of	*n*	,,	*ñ.*

The letter *c* will always be used to indicate its soft sound as in *centre;* and *g* will be employed for the hard sound of that letter as in *gale.*

II.—*The Physical Geography and Climate of the Colony of Natal.*

By Robert James Mann, M.D., F.R.G.S., F.R.A.S., Superintendent General of Education in Natal.

Read, November 26, 1866.

The Colony of Natal lies on the Eastern Coast of South Africa. It is about 800 miles beyond the Cape of Good Hope, and is included between the 27th and 31st parallels of south latitude. It is a small land, having an area not exceeding one-third the area of England; but it occupies a very important and interesting position as being the focus and centre, and therefore the type, of what Dr. Livingstone, and others, have termed "the Kaffir zone" of South African climate.* It has a sea-coast of 150 miles trending from south-west to north-east, and looking out into the Indian Ocean. The lower, or southern, half of this coast has a range of mountains lying parallel to it at a distance of about 100 miles, and thus forming the opposite or inland frontier of the colony. Further north this mountain frontier bends back into a kind of hollow bay, with a sharp *angular* extremity, which is 40 miles further from the sea. The so-called mountains are, however, properly a ledge, or step, rather than a ridge. They are the first abrupt descent by which the main central table-land of the great continent subsides towards the sea-border. The face of the step, looking towards the colony, is a bold and buttressed wall several hundred feet high; whilst, on the other side, the abrupt barrier makes a very trifling dip to the high plains of Basuto-land and the Orange River Free States. The crest of this ledge is generally between 5000 and 6000 feet above the sea; but its higher peaks and jags rise to between 7000 and 9500 feet. The extreme northern corner of the colony, where the Buffalo River comes out from the inland mountain frontier, is within about 200 miles of the southern tropic. The entire land is therefore sub-tropical;—that is to say, it possesses the leading characters of a tropical climate in a subdued and pleasantly softened degree. In actual size the colony comprises 17,000 square miles; or, in other words, 11,000,000 of acres of land.

From the salient point of the Drakenberg Mountains, where the barrier begins to retire to form the bay already described, there comes forth a subordinate mountain ridge, which crosses the middle of the colony as a high central back-bone, stretching north-eastward until it almost strikes the *river* frontier in that

* See Wilson's Paper on "Water Supply in the Basin of the Orange River," 'Journal,' vol. xxxv. p. 106.

Map
OF THE COLONY OF
NATAL
to accompany the Paper by

Dr R. J. Mann

English Miles
10 20 30 40 50

29 30 31

28 29 30

ORANGE RIVER FREE STATE

ZULULAND

BASUTOLAND

ADAMKOKS LAND

DRAKENBERG

KLIPRIVER

Dutch Laager
Ingoga R.
Imbazane R.
Ingandu R.
Newcastle
Port Lucas
Leo Kop
Injaguane R.
Sunday's R.
Sand Spt.
Buffalo R.
Biggarsberg
Isandhlwana Mt.
Matuaans Kop
Van Reenen Pass
Modder Spt.
Sunday's R.
Wash Bank
Isibindi R.
Gregory
Lombards Kop
Jobs Kop or Elanga
Sand R.
Ladysmith
Venters Spt.
Spijoen Kop
Sand Spt.
Tugela R.
Colenso
Weenen
Blaauw Kranz
Bushmans R.
Mooi R.
Mt Allard
Ft Buckingham
Great Tugela R.
Estcourt
Greytown
Hermansberg
Table Mt
Cathkin Peak or Champagne Castle
Bushmans Pass
Mooi R.
Westown
Mt West
Umvoti R.
Hlimaleti R.
Norwegian
Mapumula
Fort Williamson
Komberg
Fort Nottingham
Giants Castle
Lidgetton
Bushmans Stable
Spijoen Kop
York
Esidumbini
Groutfield
Stanger
Nonoti R.
Umvoti R.
Umhlali R.
Umsumdusi
Albert
Howick
Umgeni R.
Umgeni Fall
Spitz Kop
PIETERMARITZBURG
Table Mt
Victoria
Tongaati R.
New Glasgow
Inanda Mt
Umgeni R.
Umhloti R.
Verulam
Inanda
Umkomanzi R.
Umlazi
Thornville
Lit. Bushmans R.
Zeekoe I.
R. Umgeni
Pinetown
Berea Hill
Richmond
Byrne
Indaleni
DURBAN
PORT NATAL
The Bluff
Umlazi R.
Umlazi R.
Ilovo R.
Mt Misery
Amanzimtote
Umkomanzi R.
Springvale
St Michaels
Umpambinyoni R.
Amahlongwa
Scottburg
Umzinto R.
Ifafa
Umzumbe
Umzumbe R.
Sutherland
Harding
Umzimkulu
Marble
Shepstone
Hancocks Drift
Isanjombe
Ingwagwane R.
Umzimkulu R.
Ibisi R.
Ipotela R.
Umzimhlabu R.
R. St. John
Lidgetton
Longitude West

Published for the Journal of the Royal Geographical Society by J. Murray, Albemarle Street, London, 1867.

Edwd Weller

direction. This ridge is fingered towards the sea, and between the fingers separate rivers drain down. There are five fingers, and there are four main grooves or rivers, which are respectively known as the Umvoti, the Umgeni, the Umlazi, and the Ilovo. The extremities of the fingers are also split into yet smaller cracks, out of which issue thirteen other lesser rivers. Further south a somewhat similar state of things is continued; but the main ridges there come direct from the Drakenberg, instead of from a central secondary offset. The chief ridges in this direction lie between the Umkomangi, Umzimkulu, and Umtamfume rivers; but there are also subordinate fingers, and subordinate streams, so that there are altogether about fifty distinct rivers, large and small, opening out each by a separate mouth along the 150 miles of coast. The traveller who rides along the land near to the coast is always either climbing up out of a water-course or descending into one.

The coast is everywhere comparatively low. There the hills range from one to three or four hundred feet in height. On the sides of these hills, and in the valleys lying between, sugar, coffee, arrowroot, and most other plants of tropical habit and constitution, grow and thrive. The coast counties of Victoria, Durban, and Alexandra, are now the seats of considerable industrial activity. There are now sixty-three sugar-mills in operation in this district; and the year before last there were produced in it 7000 tons of sugar, 62,000 pounds of coffee, and 115 tons of arrowroot. In leaving the coast the ridges of the land rise higher and higher, until at the distance of 70 miles from the sea, on the great central back-bone already alluded to, the main road lies 5400 feet, or rather more than one mile, high; and the summits of the surrounding hills have a still loftier elevation. In climbing this slope, the tract where sugar and coffee can be grown, and where the pine-apple and banana ripen, is left at a distance of about 16 miles from the sea; and a region of green hilly pastures is entered upon, where cattle and horses thrive, and where wheat and oats, the potato, and many of the food-crops of Europe, can be advantageously cultivated. On the tops of the hills of the central districts sheep are now becoming abundant, and doing exceedingly well. In the year before last there were in Natal, in round numbers, 290,000 head of cattle, 170,000 sheep, and 15,000 horses. In order that the correct meaning of these numbers may be apprehended, it must be understood that the land has only been an European settlement forty years, and a British dependency twenty years.

Indian corn and tobacco grow everywhere, both on the coast lands and in the uplands, in the utmost luxuriance.

The northern division of the colony, which lies beyond the great central back-bone, whence descend the five fingers and four rivers, is one broad watershed or basin, coming out from the retiring bay of the Drakenberg already alluded to, and having its streams all gathered together at the north-eastern frontier of the colony into one common outlet or channel, which thence runs through a course of about 70 miles to the sea, and is known as the Great Tugela River; a frontier river all the way. The central branch of these upper tributaries of the Great Tugela is still called the Tugela, and comes out from the notch of the retiring angle or bay of the Drakenberg, by a single bold leap of more than 2000 feet perpendicular height. The other tributary branches of this water-system are the Mooi River, which collects from the south along the northern slope of the great central back-bone and the Buffalo River, which collects from the north and is there the frontier of the colony in upward continuation of the Great Tugela. This northern district is thus a rhomboid space, included between a western mountain-fork and an eastern river-fork which touch at their divergent points; and this space contains the so-called Upland Counties of Weenen, Klip River, and Newcastle. The river confluents which lie between the Northern Buffalo and Central Channel are the Sunday and the Klip rivers. The confluents which lie between the Southern Mooi River and the main channel are the Bushman, the Blau Kranz, and the Little Tugela rivers. Thus, then, in advancing inland in Natal from the coast, along the main line of road, the traveller, who has climbed for 70 miles, dips down into a broad basin, and does not ascend so high again until, after passing all the confluents of this river-system, he mounts the actual wall of the Drakenberg. The hills in this broad valley are high toward the Drakenberg, and resemble the more elevated grounds of the central back-bone: towards the confluence of the rivers the valleys are comparatively low, bush-encumbered and warm. This is so much the case that at Weenen, down towards the mouth of the Bushman's River, and 70 miles to the north of Maritzburg, the orange ripens as perfectly and as readily as it does on the coast.

A very interesting feature of physical geography is involved in the contrasted characters of these two several divisions of the colony of Natal,—the Northern one-river basin, and the Central many-river basin. The first, it will be remembered, issues from the great retiring angle of the Drakenberg frontier; the other hangs upon the great salient angle of the Drakenberg, which it may be here stated stands boldly out into the colony as a buttressed and battlemented mass, and is widely known as a prominent object in the landscape under the name of "The

Giant's Castle." The distribution and disposition of the Drakenberg is indeed the obvious cause of the contrast. The inward fold of the Drakenberg, in the region of the retiring angle or bay, has caused all secondary disturbance and ridges to converge towards a common point or focal centre, where gaps just large enough for the escape of the waters of the basin-area have been left or worn. The backward bend of the Drakenberg, on the other hand, has caused the secondary disturbance and ridges to *ray-out* from the salient point like the fingers of a hand or the sticks of a fan. Where the great mountain-line folds in, the watershed is convergent and the river-system one-mouthed. Where the great mountain-line bends back, the watershed is divergent and expansive, and the river-system many-mouthed. Natal is properly but the narrow rim of the great African table, irregularly bevelled towards the sea. The general plan of the carving of this rim is ribs running outwards with water draining down to the sea between the ribs. But in one place the rim itself has been contorted into a zigzag, and there the ribs have been squeezed convergently in the hollow of the contortion, and expanded radiantly from the prominent points. Hence Natal has its great northern basin of the Tugela, draining nearly one-third of the area of the colony into one vast river; and its coast district fringed by fifty distinct streams, which drain the other two-thirds.

The central high back-bone of the colony lies in the fine pastoral and agricultural counties of Maritzburg and the Umvoti. The coast portion of the fingers of this back-bone composes the counties of Victoria and Durban. The southern district, which lies beyond the fingers of the central highland, and which may be spoken of as the third division of the colony, contains the coast county of Alexandra, and the least-settled portion of Maritzburg County, that which is beyond the Umkomangi River, a district that before long will have to be erected into a distinct county. Until within the last few months the large River Umzimkulu, a Drakenberg-fed stream, was the ultimate boundary of the colony towards the south-west. But now a coast-strip beyond, which was a portion of the territory formerly known as No-man's-land, has been annexed to the colony under the style and title of Alfred County, and the frontier on the coast has been pushed on to the Umtamfume River, the streams feeding the Umzimkulu still remaining the frontier in the higher region. The upper part of this No-man's-land district is held by the Griquas of Adam Kok, who has settled there under the patronage of Her Majesty's High Commissioner.

Throughout the colony, the main ridges of the land, whether comprised within the great one-river basin, or forming part of

the still larger many-rivered system, are all subdivided and branched again and again. The land is everywhere, indeed, one vast maze of rolling and divaricated hills, with countless ravines and water-streams running between. These hills are higher, and covered with open green pasture, towards the central back-bone and towards the mountains; and they are lower, and for the most part bush-covered, towards the sea. By following the windings and intricacies of these ridges it is possible to go from the sea to the mountains, almost anywhere along the actual crest of a watershed, without crossing a single stream; this indeed is what the old Dutch Boers, the pioneers of the land, have really done with their main lines of roads. In every other direction the traveller is continually crossing water-courses, much as he does in moving parallel to the coast near the sea. In the uplands the highest tops of the mountains, and the boldest ravines which descend from them, are filled with a growth of evergreen timber-trees. The broader valleys are in many places covered with a thin sprinkling of thorny mimosas of small size. Much of the scenery of the uplands resembles the high moor scenery of Devonshire, with the principal exception that the land is much more brilliant from luxuriant green pasture during two-thirds of the year, and that its irregularities are on a grander scale. Much of the river scenery of the coast bears an equally striking resemblance to some of the finest dales of Derbyshire.

On account of the steep gradient of the land, already alluded to, the rivers of Natal are nearly everywhere turbulent and rapid. They rustle along through channels encumbered with large boulders of granite or trap, or pavemented with irregular and broken slabs of grey sandstone; ever and anon leaping two or three hundred feet from the top of some laminated wall, or columned precipice, into deep pools, and then coursing along through gullies and ravines picturesquely walled by sandstone, that is ornamented by clusters of aloes and candelabra spurges, or by a drapery of evergreens. The rivers are so broken by waterfalls and rapids that they are nowhere navigable excepting by boats through short stretches. Within an easy day's ride of the city of Maritzburg there are several magnificent waterfalls that would make the fortune of any place in England. One of these, only 16 miles from the city, on the river Umgeni, is within a foot of twice the height of Niagara. The river leaps from a wall of columnar basalt, notched in by the fall into a deep ravine that has been cut into trap for a considerable distance. Most of the rivers are encumbered by bars of sand crossing their mouths, that are only broken through at periods of flood, and their mouths are by this agency expanded into

broad and deep lagoons, filled with water that is often brackish from the breaking of the sea at high tide over the sand-bars. The larger rivers, the Tugela, Umgeni, Umkomangi, and Umzimkulu, are open at all seasons, with partial sand-bars, but with water-channels large and deep enough for the passage of boats of a few tons' burthen. But the mouths of the channels are intricate and rock-encumbered. A small steam-boat has been taken into the Umkomangi, and some slight works have been undertaken to improve the entrance of this river.

The green hills of Natal are nearly everywhere moulded in granite, trap, or sandstone. These several rocks are mingled in almost inextricable confusion. The trap continually breaks through the older rocks, and especially the sandstones, and overlies them in vast swelling and spreading masses. The tops of many of the hills are expanded surfaces of bare trap-rock, scattered with huge stones of the same material, seemingly separated from the general mass in a semi-plastic state, and not water-worn.

The Klip River (Stone River) takes its name from passing through stony districts of this character. The sandstones are continually fissured, and grooved through by the rivers. Some of them are of the old large-grained Silurian type, in very large masses; others have the character of excellent building free-stones. The peculiar table-mountains, so well known as characteristic of the South African districts, are vast tables of Silurian sandstone, 400 or 500 feet thick, and 3 or 4 miles broad, reared up on buttresses of granite or gneiss, which slope out from beneath the tables as grass-covered ridges. The perpendicular faces of the sandstone tables are bare, horizontally-ledged rock, which lights up very brilliantly in the rays of the declining sun. These table-mountains look down into grand ravines and valleys many hundred feet deep, with a silver streak winding away in sight for miles at the bottom. They are, however, portions of the general system of ridges, slightly notched out, or perhaps somewhat reared, from the rest of the range. This is well illustrated in the case of the very beautiful Table Mountain which is visible from the city of Maritzburg towards the east. This Table Mountain is simply the termination of one of the subordinate fingers which comes down from the Giant's Castle through the Spijoenkop, and through the fine range of hills looking down upon Maritzburg from the north, lying in the fork where the Umgeni River, which lies to the north of this range, is joined by its tributary, the Umsundusi, the river of the city of Maritzburg.

The surface of the rock foundations of the land, the granites, traps, and sandstones, are in very many places masked and

veneered by shales, which, in some instances, almost pass into the condition of true slate. The hardened muds of the old formation are in their turn disintegrated by the agency of the atmosphere, and of most energetic vegetable life, and so transmuted into more or less fertile surface soil, not unfrequently rich in humus. The shales are in general use for building, especially for the construction of foundations laid beneath the ground.

As a general rule, the granites and gneiss occur most frequently within 40 or 50 miles of the coast, and shales and fossiliferous sandstones, perforated and overlaid by trap, are most abundant in the northern districts, and especially in the basin of the Tugela. A species of amygdaloid or claystone porphyry is also not unfrequently associated with the granites, gneiss, and Silurian sandstones.

True limestone is very rare in Natal. It has been found in large continuous masses beneath the soil in one or two places, as for instance near the sources of the Blau Kranz, in the county of Weenen. But within the last few months a very magnificent bed of crystalline limestone, in places almost rivalling Carrara marble in excellence, has been discovered on the River Umzimkulu, partly in the new Alfred county, and partly in Alexandra county, and within half-a-dozen miles of the sea. This mass is estimated to cover an area of 20 square miles in extent; and at one spot the river passes beneath a precipitous wall of white marble 1000 feet high.

There are very large deposits of fine bituminous coal in the great basin of the Tugela. This coal has been seen on the surface in many places where the channels of the rivers are cut through it; and the waggoners stop as they pass, and fill a few sacks to take away with them and sell to the blacksmiths in the towns. The beds are of considerable thickness; but the actual extent of the coal, and the connexion of the several masses, has not been yet determined. Carboniferous shales, with quite the lustre and aspect of coal, and easily made red hot by a strong air-blast, crop out in other places, as in the Umvoti, and on the coast on the Umhlali, 40 miles to the north-east of Durban. Ironstone of various qualities is very abundant in all directions. It is dug out in nodular masses of from 1 to 3 feet across from beneath the surface-soil of most of the gardens in Maritzburg. An ore found in Umvoti county, almost malleable in its crude state, has been known to the Kaffirs for a very long period, and rudely worked by them. Fine ores of copper have been also recently discovered near and beyond the south-west frontier.

The coast of Natal is for the most part rock-bound. Granite, sandstone, trap, and basalt, alternate with each other in furnish-

ing provocation to the surge. In places stretches of fine compact sand alternate with the rocks. Near the mouth of the Umzimkulu there is a very beautiful tract of columnar basalt exposed upon the beach. Further south, in No-man's-land (now Alfred county), there is one region where the granite rocks closely resemble the rocks of the Island of Jersey. They are of great diversity of colour, and intersected by walls of black basalt, and present a very bright and beautiful appearance when the sea-spray is breaking over them in the almost tropical sunshine. The sandstone rocks are commonly scooped into hollows and basins, which are kept filled by the sea-spray, and thickly inhabited by pigmy editions of all kinds of shelled Molluscs,—*Cypreæ*, *Neritæ*, *Volutes*, *Trochuses*, *Murices*, and the rest. At the extreme south-western boundary of the colony, near the mouth of the Umtamfume, and more particularly between it and the Umzimba, the second river beyond, there is a remarkable fossiliferous bed laden with Ammonites, *Trigonia*, *Terebra*, a large Univalve allied to the Chemnitzia, and containing Brobdignagian Muscles, probably of the genus *Pinna*, between 2 and 3 feet long. It is quite impossible to get these muscles out from the matrix. They can only be seen *in situ*, in caves that have been washed out by the breakers in the sea-cliff. The hinge-mass has a transversely laminated structure, like that of the *Inoceramus* of the chalk. At low water a large pavement, studded with these fossils, is exposed along the beach. The rock is a limestone, seemingly of the Oolitic period.

The inner bay of Natal is one of the most interesting possessions of the young colony, and is remarkable as being the only land-locked harbour along many hundred miles of inhospitable coast. It is a shallow tidal basin, about 4 miles long, with deep water-channels, and sheltered to the south-west by a grand bluff and hill-range above 200 feet high, and to the south-east by a low dune of blown sand, which is there thrown up along the sea-beach from the entrance of the bay to the mouth of the River Umgeni, a distance of about 4 miles. The Bluff-range itself has obviously at some former time been an outlying island, as it subsides entirely towards the River Umlazi, and leaves there a tolerably broad sea-gap. The Bluff-point and the Sand-spit approach each other from opposite sides at a broad angle, and leave between them a water-channel into the inner bay, which is encumbered by a shifting sand-bar. Two small insignificant streams of fresh water drain into the bay. The scour is mainly due to the influx and efflux of the sea, and to the large area of the basin. The tide rises and falls 6 feet, and a considerable portion of the bay is dry at low water. The ships lie at anchor in a deep channel just within the protec-

tion of the Bluff. Ships of 500 and 600 tons' burthen enter easily at times of high tide; but the bar is subject to alternate fits of kindliness and ill-humour. Works, under a plan of Captain Vetch's, were commenced some time since to enclose the seat of this bar in a large outer basin formed of wooden frames laden with stone. One of the piers now stretches out about a third of a mile into the sea; but the works are in a state of temporary suspense, on account of a difficulty with the contractor.

The interesting point, physico-geographically, in connexion with this bay is that it is altogether an external appendage, and, so to speak, after-thought of Nature. Inland of the basin there is a fine range of bush-covered hills (the Berea), 360 feet high. This is obviously the old and proper line of coast, continuous with the rest of the coast northwards. But the coast-hills from the south (the Bluff Hills) stand out further to seaward, and overlap this, so that a gap, quite open to the north-east, is left between. A ship in the north-east, 3 miles out to sea, off the mouth of the Umgeni, looking south-westwards, would have the mouth of an open valley formed by the Berea Hills on the right hand, and the Bluff Hills on the left hand, before it. The mouth of this valley has been barred by blown sand, except just under the point of the Bluff, and even there the bar is continued under water. The space within and between the two hill-ranges is now partly shallow water, and partly a dry sand-flat, raised about 20 feet above the level of high water. The sand-flat is the little plain upon which the town of Durban has been built, and the water is the land-locked harbour or inner bay. The drifting along of the sand in the sea-currents, the rolling of the breakers, and the overlapping position of the Bluff Headland, have gradually issued in the formation of this harbour, with its low sandy outworks and barriers.

Thus, then, the colony of Natal is, in the main, an inclined slope of land 150 miles long, with a gradient of 1 in 70, looking out to the sunny Indian Ocean, in parallels of south latitude nearly tropical. The rapid slope and considerable elevation of portions of the land confer upon it diversities of climate that enable the productions of temperate and tropical regions of the earth to be successfully reared. But this does not complete all that has to be recorded in praise of its climate. Another consequence follows from the arrangement of this land-slope, looking out to the Indian Ocean in nearly tropical parallels; the fact, namely, that the land is abundantly supplied with water, and that the greater part of this abundance falls in the season of summer, rather than in the season of winter. The streams of Natal never dry up, but they are swollen during the period of greatest

heat; and at their lowest during that of greatest cold. The summer in Natal is a season of frequent heavy rain, and still more frequent cloud; hence the heat never assumes the almost tropical fierceness which it would otherwise do in such close neighbourhood to the tropics. The summer heat is tempered by cloud-screens and constant evaporation. The winter in Natal is a season of almost constant genial and June-like sunshine. This is exactly the opposite of what obtains at the Cape of Good Hope. The summer there is the season of scorching and drying heats, and the winter the season of wetness and cold. The reason for this remarkable and beneficent peculiarity has now to be explained, and the peculiarity itself followed out in detail by the light of deductions made from eight years' close and incessant study of the meteorology of Maritzburg.

Natal lies in a region of the earth that is naturally within the influence of the great south-eastern trade-wind set of the atmosphere for at least a considerable portion of the year. But this natural inclination of the air to move from the ocean to the land is greatly reinforced on the coast of Natal by another agency, which is yet more constant and more powerful. The nearly vertical sunshine falls upon the land-slope for the greater part of the year, with a force that rapidly heats the superimposed air, and expands as it heats, until the thin air is driven back before the advancing stream of heavier atmosphere that flows forward from the comparatively cool surface of the Indian Ocean. This deduction is not a matter of hypothesis. It is a result of direct observation. For instance, during 1095 evenly spread observations made at Maritzburg last year, the wind was blowing *in* from the sea 820 times, and *out* to the sea 145 times.

Now, when the sea wind comes in upon Natal from the broad sweep of the Indian Ocean, it is necessarily laden with pretty nearly as much invisible vapour as it can carry. With this burthen it rushes along upon the land, and as it rushes it glides up and up the slope which has been described. Before long it has made an inland journey of 70 miles, and is 1 mile high. It then finds itself freed from about a sixth part of the load and downward pressure which it sustained at the sea-level. Being freed from this pressure it expands, and becomes intrinsically rarer; and being rarer, it is incapable of supporting its original burden of vapour. Accordingly, the vapour first gathers as mist, then thickens as cloud, and finally deposits as rain; the deposit being accompanied by electrical disturbance and thunder. After a time this disturbance so drains the air of its superfluous moisture that the atmosphere clears, and the sunshine resumes

its fervent sway; when the same state of affairs is brought back, and the same course is again entered upon.

Maritzburg, the capital of the colony, stands about two-fifths of the way up the slope, 40 miles in a direct line from the sea, and 2000 feet high. The observatory at which the meteorological observations were made is placed in 29° 36′ 13″ S. latitude; and 30° 1′ 34·5″ E. longitude, and is 2095·674 feet above the Custom House at Durban, which is just above the high-water level of the sea. In Maritzburg 40 thunderstorms occur during the six hottest months of the year; and lightning, indicative of a thunderstorm near at hand, is seen on ten other days. Thus, during this season of greatest heat there are thunderstorms on nearly each third day; and during a considerable part of the season there is rainfall on each second day. It is thus that summer heat in Natal is so remarkably tempered by the combined influence of the cloud-screen and the frequent watering. Almost every day in summer gets cloudy soon after noon, and the clouds continue to shroud the sky and screen the ground until far into the night, when the sky clears, and the stars come forth. Unless on the exceptional occasions, to be hereafter alluded to, when the hot land-wind blows in force, the summer temperature of Maritzburg does not rise above 84° or 85° of Fahrenheit's heat-scale. In the last year there were only twelve days on which the temperature rose above 90°.

The highest, the mean, and the lowest temperatures of each month for the six hottest months of the year, deduced from observations through a period of eight consecutive years terminating with 1865, were:—

	Highest.	Mean.	Lowest.
October	96·0°	66·6°	45·2°
November	97·2	67·1	45·2
December	97·6	70·4	52·2
January	93·0	71·4	51·8
February	97·1	71·8	55·8
March	92·8	69·7	42·0

It will be observed here that, although the extreme temperatures are liable to occur in any of these months, the mean of any one month never rises to 72°; and that the range of the mean for these six months scarcely exceeds 5 degrees. The mean temperature for the six summer months is 69·5°. The night temperature in these months rarely descends to 52°, and never goes below 42°.

In the winter months the sun shines with less intensity upon the land, and consequently the monsoon air-currents and the atmospheric up-cast are less violent. A steady sea-wind blows; but this wind is more rarely broken by thunderstorms. Only

ten thunderstorms occur in Maritzburg in the six winter months of the year, and these fall at the beginning and end of the season, which must be looked upon as periods of transition. It hence happens that as *the summer* is the season of frequent cloud and thunderstorm, *the winter* is the season of comparatively unbroken sunshine. In the last year there were at Maritzburg only twenty-one days of unbroken cloud during the six months of winter, and there were forty-nine in which the sunshine was uninterrupted through the day, the rest of the time being days on which sunshine greatly preponderated over cloud. The rule in winter is that the sun breaks forth in splendour soon after its rising, if it be not clear from the horizon, and that the temperature mounts rapidly to somewhere between 70° and 80°, so that only light clothing can be worn in the midday of even this period. The temperature then falls so low in the evening, and at night, as to make a wood-fire pleasant, although not indispensable, to healthy and hardy men. On the coast a fire is not lit, excepting for cooking, all the year round; and, in many places in the uplands, people who have stirring occupations never think of a fire in their sitting apartments. Indeed, the rule in the colony still is to build rooms without fireplaces; although this is a rule which will certainly be departed from as the settlers grow more wealthy. In journeying at this season the traveller rolls himself up in his tented waggon, at dark, in blankets, and rises at the first dawn of day to find himself warmed genially at Nature's own fire, by the time his open-air toilet and his first arrangements for the business of the day are completed. The fresh cool daybreak under canvas and the early basking in the first slant rays of the rising sun, at the tent door, are certainly among the prominent delights of a Natal residence.

The highest, the mean, and the lowest temperatures of each month for the six coldest months of the year, deduced from the observations of eight consecutive years, were:—

	Highest.	Mean.	Lowest.
April	89·5°	64·8°	40·2°
May	85·2	59·3	35·4
June	78·2	55·2	32·0
July	82·2	55·2	29·0
August	89·8	59·7	34·8
September	95·4	65·1	38·0

It will be observed here that there is no month in the winter in which the temperature is not liable to rise to 78°, and that the range of the mean of these six months extends to nearly 10°. The mean temperature of the coldest month is above 55°. The mean temperature for the six winter months is 59·9°. On the severest nights the temperature only just dips below the freezing-point. In a period of eight years the temperature at

Maritzburg has only been five times below freezing, and three of these five occurred on three consecutive nights in the month of July, 1864. In the last year there were only eight days during the six winter months on which the temperature did not rise to 60°; only twenty-three nights on which the temperature fell below 40°, and only two nights on which it fell to 36°.

One direct consequence of this coincidence in Natal of the period of greatest heat with the period of greatest moisture is the wonderful luxuriance with which the land is clothed. As the visitor sails along the coast from the Cape to Natal, he finds himself suddenly entering a new region of greenness. The impression made on the Cape colonist, when he first visits Natal, is almost invariably akin to that which is experienced on going suddenly into a well-kept garden. The same feeling is awakened in a degree even on crossing the Umzimkulu, near the coast, into the old territory of Natal.

The extreme range of temperature, during eight years, was limited to 68·60°. There is considerable vicissitude, and to this vicissitude, indeed, much of the healthiness of the climate is due. The frequent relief from great heat makes the general high range of temperature much more endurable than it would otherwise be. The change also introduces an element which may become harmful under certain circumstances, that, namely, of chill after exposure of the living frame to a high temperature. Most sicknesses in Natal occur in the cold period following on great heat. I have no doubt that the so-called Natal sores are produced by the depressing influence of chill, operating upon cutaneous capillaries that have been exhausted by long sustained stimulation. It is a common remark that illness among cattle is apt to be produced by what are called sea-rains. Now these occasional sea-rains are invariably connected with cold gales blowing in from the ocean. These rains are not ordinarily heavy on the uplands, but they are chilling. It is not unworthy of remark that this cause of mischief is one which can be largely guarded against by care, intelligence, and good management. Protection from chill consequent upon sudden depression of temperature is an affair that comes quite within the domain of art; the chill can be avoided by warm clothing, well-regulated exercise, comfortable dwellings, artificial fires, and the various expedients that act upon live stock in the same direction. Sudden cold is more easily obviated than long continued heat.

The large vicissitude of temperature tells differently at the opposite seasons of the year. In the summer season the *daily range* of temperature is comparatively small, and the vicissitude lies between day and day. In the winter season the *daily range*

is comparatively large, and the vicissitude lies between day and night. This is a natural result of the cloudiness of the summer day and of the sunniness of the winter day. The cloud keeps the day temperature from rising so much above the night temperature as it would otherwise do in the summer-time. The sun, on the other hand, in winter lifts the day temperature far above the night temperature. This is singularly and strikingly illustrated when the temperatures are laid down as zones upon paper. The winter zone is a broad even sweep, with very slight irregularity of outline. The summer zone is a narrow belt broken up everywhere into Alpine peaks and intervening abysses.

The mean temperature of Maritzburg, for a period of eight years, is 64·71°; the mean highest temperature of the year, for this period, is 95·60°; and the mean lowest temperature of the year 33·10°. The highest temperature that occurred in this period was 97·60°, and the lowest temperature 29·00°. The mean temperature of the coast-district is about 3·5 degrees higher than the mean temperature of Maritzburg; but this district experiences less extremes of both heat and cold. Its climate is more equable; it is indeed semi-insular, and approaches in a small degree towards the climate of the Mauritius. The impression made on going from the uplands to the coast is somewhat like that which is experienced on entering a warm and moist conservatory.

The rainfall at Maritzburg is very nearly the same as the rainfall of London. The mean fall for a period of eight years was 30·11 inches. The greatest yearly fall, during this period, was 37·31 inches; this fall, however, is not so evenly spread over the entire year as in England. The fall takes place principally in the six hot months that lie between September and April. There are two mid-winter months (June and July) in which only seven-tenths of an inch of rain falls for the month, that fall being distributed into three days and a half. For the two months before, and the two months after June and July, the fall is 1·4 inches distributed into $8\frac{3}{4}$ days. During the six summer months 4 inches per month fall, and the fall is distributed into $15\frac{1}{2}$ days: thus 24 inches out of the entire 30, or four-fifths of the whole quantity, fall during the summer half of the year.

During the comparatively dry season of winter the dews are frequent and heavy on the uplands; hence the water-courses do not dry up. The rivers and streams run all the year; but the water is low in winter, so that horsemen can ride and waggons be driven through every stream that is encountered. Even the large Tugela, nearly two-thirds of a mile wide, is then

fordable near its mouth. In the summer season the water is deep in most of the rivers, so that they are impassable otherwise than by bridges, boats, or swimming. On the whole, on account of the broken distribution of the land and the general set of the air-currents, the land is wonderfully well watered. There is scarcely a spot in the colony, excepting on the very hill-tops, to which water may not be led by a little contrivance.

The rainfall on the coast-districts is about one-half as much again as at Maritzburg; this is chiefly due to the sea-rains being heavy on the coast, and comparatively light on the uplands. On the higher hill-tops these sea-rains become merely heavy mists. In the month of June, last year, I was caught by a sea-rain between two small rivers on the coast, and detained by the flood seven days, and then finally gave up the attempt to push onward over the swollen and dangerous streams, and made my way home to Maritzburg along one of the main ridges of watershed. The rainfall on the coast during these seven days amounted to $9\frac{1}{4}$ inches, 2 inches falling within twenty-four hours on two occasions. The fall at my observatory at Maritzburg, for the same period, about 40 miles from the coast and 2000 miles high, was a trifle over one inch and a quarter! Falls of this extreme character are fortunately comparatively rare; a much more serious, and, indeed, disastrous one occurred in the month of April of the year 1857. It is said that 27 inches of rain fell at Durban, and between 10 and 11 inches at Maritzburg, between the fourteenth and sixteenth days of the month. I was not in the colony at that time, and cannot vouch for the accuracy of this estimate; but, at any rate, there is no doubt that the Umgeni River rose 28 feet above its usual level near its mouth, and burst quite across the sandflats, described in a previous page as the site on which Durban stands, to the Inner Bay. The water was at one time within 12 feet of the level of the principal street of the town. The Tongaati River rose 30 feet above its usual level. The Umvoti River rose 16 feet, and spread a bed of sand 4 feet deep over the neighbouring pastures. Even the Maritzburg river, the Umsundusi, where the fall was so much less, carried away its bridge, and cut off the communication between the city and the port for several days. The sea-beach was covered by trunks of trees and beds of reeds, brought down by the rivers; 200 dead oxen were counted at one place on the beach, within a distance of 10 miles. The thunderstorm-rains of the summer season are commonly heavier on the uplands than on the coast. This is well marked at the elevation of Maritzburg, and is still more notable at greater heights.

The days and amount of rainfall at Maritzburg for the several months of the year, expressed in an average deduced from observations of eight years, are—

	Rainfall, in inches and tenths.	Days on which Rain fell.
January	3·92	16
February	4·41	14
March	3·29	13
April	1·44	9
May	0·95	3
June	0·26	1
July	0·23	2
August	0·14	5
September	1·32	8
October	3·60	17
November	4·58	17
December	5·04	18

The actual rainfall at Maritzburg for eight years was—

	Inches and tenths.
1858	27·42
1859	28·40
1860	30·60
1861	22·41
1862	29·97
1863	34·66
1864	37·31
1865	31·08
Sum total for eight years	241·85 inches, or 20 feet.

The mean humidity of the air at Maritzburg at nine in the morning, deduced from a period of eight years, was 71·2° (100° representing saturation). At three in the afternoon it was 60·1°; and at nine in the evening 83·4°. The mean humidity for the year was 70·8°.

The mean height of the barometric column at Maritzburg, deduced from observations during a period of eight years, was 27·891 inches. A mean of a comparison of eighty sets of observations by standard barometers gives 2095·674 feet as the height of the observatory above the Custom House at Durban, which is near the high-water level; the exact position of the observatory being 29° 36′ 13″ of S. lat., and 30° 1′ 34″ E. long. The highest reading during eight years was 28·474 inches, and the lowest reading 27·215; the extreme range for this period being therefore 1·259 inches. The mean yearly range for the period of eight years is 0·991 of an inch. There is a constant daily rise and fall, the greatest fall occurring two or three hours after noon, and the mean daily range of this rise and fall being 0·078 of an inch. This daily fluctuation is of course dependent

on the direct influence of the sun. The sun rarefies and lightens the air every day as it shines down on the earth's surface from a high elevation.

Within the limits which have been thus named the barometric column is in a state of incessant movement. This is immediately seen when the successive heights are laid down in curved lines upon paper. There are little daily billows in the line, the troughs between the billows corresponding with the early afternoon hours of the day. But there are also large waves, varying in number between four and seven in each month. There can be no doubt that this succession of large waves is due to a constant and recurrent reversal of the set of the atmosphere. When the general movement of the mass of the air is from south to north the barometric column is pressed up, and when the general movement is from north to south the barometric column falls. The direction of this main movement is not always indicated correctly by vanes, because there are frequently local currents produced on the actual surface which conceal and mask the larger movement. Occasionally the southward movement of the air is developed along the surface in its full intensity. There then occurs what is known in Natal as the "hot wind." This wind begins to blow from the north-west in the early morning with extreme violence, and continues in great force until noon or the early afternoon, when it suddenly lulls, and is followed by a fresh sea-breeze. During its continuance the barometric column falls, and the temperature rises to somewhere between 86° and 97°. The air becomes so parching and dry that living plants shrivel, and articles of furniture shrink and crack. In extreme cases the moisture of the air sinks even below 33°. This wind is almost always followed by a thunder-storm. It is somewhat remarkable that this wind scarcely ever extends quite to the sea-coast. It rushes down some distance beyond the parallel of Maritzburg, and then encounters the sea-breeze in its full strength and in some way glides up above it. When the hot wind is blowing in full force at Maritzburg there is generally a much gentler breeze setting more or less along the coast at Durban, and a temperature some 7° or 8° cooler.

The hot wind blows at Maritzburg upon an average 25 times in the year. It is liable to occur in every month of the year; and when its recurrence is watched through a brief period, it does not seem possible to connect it with any certain condition or law. But when it is noted for a longer time it becomes clearly apparent that it is intimately connected with the seasonal position of the sun. This is strikingly illustrated when the mean frequency of its recurrence in the several months

of the year for a period of eight consecutive years is numerically expressed. For the last eight years this frequency stands in the following ratio:—

	Mean for eight years.
January	1·3
February	1·2
March	0·7
April	0·8
May	1·2
June	0·8
July	2·3
August	3·2
September	5·1
October	4·2
November	3·0
December	1·7

It will be seen, from this deduction, that September is the great month for the hot wind, and that it prevails more and more frequently in the two months that precede September, and with diminishing frequency in the two months that follow September; and that it is of comparative rarity in the other months of the year. It may be looked for about once in the months of January, February, March, April, May, and June; about twice in the months of July and December; about three times in August and November; four times in October; and five times in September.

The violent hot wind of Natal is clearly connected with the winter gale of the South Atlantic that so frequently works devastation in the neighbourhood of the Cape of Good Hope. On the 17th day of the month of May last year (1865) a furious north-west gale burst upon Table Bay, and destroyed a considerable number of ships. The mail steam-ship *Athens* was driven upon the rocks in making the attempt to steam out to sea from the bay, and lost, with every living soul on board. Now the approach of this gale was indicated at Maritzburg by the movements of the barometer six days before, and during the height of the storm a fierce hot wind was blowing in Natal. On the morning of the 11th of the month the barometer was standing at 28 inches and a tenth; from this it fell during eight successive days until it was depressed to 27 inches and seven-tenths. It then rose suddenly and rapidly for three days until it reached nearly to 28 inches and four-tenths. There was thus a great atmospheric hollow or furrow 11 days broad, and at the instant of the greatest depression of this furrow there was a north-west gale blowing at Table Bay and a hot wind blowing at Maritzburg. The crisis of the gale took place about twenty hours later at Maritzburg than at Table Bay; that is to say, the focus of the disturbance required so long to

travel from the meridian of Table Bay to the meridian of Maritzburg, a distance of 800 miles in round numbers. The temperature rose at Maritzburg during the crisis of the gale to 85°, although it was near the period of mid-winter. The wind was from the south-east at the beginning of the barometric depression. On the 15th it veered from south-east to north-east, then passed to south-west, and back to north-east. On the 16th it was blowing strong from the north-west, then passed to south-west and south-east, and on the 18th again burst into fierce north-west with the lowest dip of the barometric depression; after this it veered through north-east and north to east as the mercurial column rose. The sudden and violent reversals of the air-current about the period of the height of the gale conferred somewhat the character of the cyclone upon it; but my own impression is that these turbulent hot winds are rather manifestations of one of the great forces that underlie the whirlwind than the whirlwind itself. I take it to be the sudden transference of what is normally the upper current of the atmosphere in mass to the lower regions near to the earth's surface, and I should look for the true whirlwind, not in the mass of the southward flowing air, but in the margins of the antagonistic streams where they come into direct conflict. The heat and dryness are in all probability the accidental results of this south-eastward flowing wind having been primarily fed from the hot and arid regions of Equinoctial Africa. In the South Atlantic the same current is fed from the broad spaces of the Equinoctial Ocean.

The winter rains occur with the high crests of the barometric waves. The thunder-storms and summer rains with the depressions of the waves, and the hot winds with the greatest depressions. Thus, rain falls in Natal with both high and low barometer. The thunder-storms burst just when the barometric column begins to rise after the lowest hollow of the depression.

The thunder-storms in Natal are of great intensity, but of brief duration. Clouds gather over the hill-tops, and then spread rapidly out into the valleys. The storm for the most part breaks first in the hills, and then moves rapidly off towards the east, giving three or four near discharges in rapid succession as it passes, and then making the rest of its display with increasing distance. The lightning is often of exceeding beauty, the track of the discharge not unfrequently being seen upon the background of the cloud as a broad quivering ribbon. Parabolloid and elliptical discharges amidst the clouds, with descending or radiating lines setting off from them, are not unusual. Occasionally very interesting streams of horizontal discharge are seen running through the cloud-caps of the Table

Mountains just parallel with and above their flat tops. The colour of the lightning is very various. It is sometimes of a bright rose tint; sometimes of the hue of pink topaz; sometimes amethyst; sometimes orange; sometimes pale blue; sometimes pearly white; and occasionally of a dead leaden tinge. When a storm occurs towards evening the horizon is illuminated for some hours after dark by incessant flashing. The end of the vast storm-cloud is brought out in deep relief at each discharge by glows of electric light bursting forth from behind its edge, the foldings and twistings of which are rendered conspicuous by lines and sheets of coloured fire. I have seen displays of this character taking place simultaneously on six different points of the horizon, and continuing for hours at a stretch, and I have counted fifty-six flashes in the minute. Accidents of course happen sometimes from the violence of these discharges. Kafirs and animals are occasionally killed. The death of European settlers is comparatively rare, for the double reason that they are much more sparsely scattered over the open country, and that their houses are generally protected by lightning-rods. The town of Maritzburg is now so abundantly protected with rods that accidents within its precincts are of very uncommon occurrence. I have only known two or three chimney-tops struck, and some half-dozen blue-gum trees shattered, during nine years. In the open country considerable numbers of oxen huddled together in the storm are sometimes killed at once. The popular notion is that the discharge runs through the beasts in succession. My own impression, derived from the appearance of the ground where such accidents have taken place, is that the discharge acts at one blow over the entire area covered by the cattle, and divides itself among them. The heaviest rainfall that I have seen during a thunder-storm has been about an inch and a half. I once only measured an inch within the hour. The heaviest fall I have known to take place within 24 hours was 3 inches.

Very heavy hail-storms occasionally happen in connection with the thunder-storms. The hail, for the most part, sweeps on in the midst of a tornado, a distinct drone, or hum, being heard to herald its approach for one minute, or even two minutes, before it arrives. Hailstones as large as pigeons' eggs are sometimes seen. Masses of ice weighing three-quarters of a pound have in rare instances been noticed. The fall of the hail is always limited to a comparatively narrow zone. The path of the hail-storm is accurately marked out over the country by a long narrow line of devastation.

III.—*On the Lower Portion of the River Indus.* By Colonel C. W. Tremenheere, C.B., Royal Engineers, F.R.G.S.

Read, December 10, 1866.

The portion of the Indus to which the following remarks apply is comprised within the province of Sind, from its most northern boundary at Mittee, on the Punjaub frontier, to the sea. The direct distance between these points is 330 miles, but by the windings of the river, as measured on the large map of the Revenue Survey, the distance is about 540 miles.

From the extensive series of levels which have been carried out by Government for irrigational purposes, many of which having been reduced to the same datum, viz., the mean sea-level as fixed by the officers of the Great Trigonometrical Survey, Mittee is 227·22 feet above the datum line; and as this point is very slightly above the water-level during the inundation of the river, the surface slope of the river may be stated to be nearly ·478 feet or 5·7 inches per mile. If the slope be calculated from Mittee to the bench-mark nearest to the river mouth, the result gives 5·8 inches per mile, or nearly identical with the former. The slope calculated from the direct distance gives ·78 feet or 9·3 inches per mile.

The general course of the river between Mittee and Sukkur is in a south-westerly direction; but immediately after passing the latter place it turns to the northward and westward, and from thence to near Oonurpoor describes a large curve having a radius of about 80 miles, with a versed sine of 60 miles. From Oonurpoor to the sea it does not diverge much from a direct course, although there are considerable bends.

I have endeavoured to mark approximately the limits of the valley of the Indus by shading the high ground which bounds it. This limit is absolute along the whole of the western side of the valley, and is marked by the hilly district, extending from Cape Monze to the west of Kurrachee, in a wide curve by Kotree and Sekwan to the entrance to the valley of Shahpoor. This hill range, portions of which are upwards of 6000 feet high, extends without a break to the Bolau Pass, and is connected with the great Sooliman Range. On the eastern side, on the contrary, the valley of the Indus may be said to have no very defined boundary; with the exception of the range of limestone hills, extending from Sukkur and Rosee to Kote Dejee, which terminates to the south in low sand-hills (similar in every respect to the desert tract which extends along the whole of this side of the valley) there is no high land which defines the boundary of the Indus Valley to the eastward.

67

68

25

24

Sonmeanee

Sonmeanee Bay

HYDRABAD

KOTREE

JERRUCK

Hubb River

Lyaree R.

Thadgye R.

Dumlote R.

Kaddajee R.

S

I

Churna I.

KURRACHEE

C. Monze

Railway

Keamaree

Mauree

Ghizree Bunder

Meance

Kadru

Munora Hd.

Ghizree Mouth

Gharrah Cr.

Gharrah Creek

Gharrah

Tatta

R. Thiri

R. Charu

R. Jhiri

Sonaree R.

Wangee R.

Piti R.

Piti Mouth

Coondee or Kadi Mouth

Coondee R.

Rahu R.

Kai Mouth

R. Kai

Pitiani R.

Durajoy

Buggaur R.

Meerpoor

Peer Putta

Buggaur R.

Mull R.

Pitiani Mouth

Coomeesa R.

R. Seeran

Seeran

R. Gorabee

Dubba Mouth

R. Jua

Jua Mouth

Hujjamree Mouth

R. Bua

R. Richel

Gorabaree

Hujjamree

Khetty

R. INDUS

Hujjamree Mouth

Kediwari Mouth

Kukiwari Mouth

Jahn Mahomed

Moorie

Mull R.

Kaha Mouth

Mull Mouth

Waree Mouth

Guloo Branch

R. Sian Branch

Shah Bunder

RIVER INDUS

Piniaree R.

Meerpoor

Coongra R.

Muggribee

Seer R.

Do

Do

KORI or LUKPUT R.

Progress of the Monsoon waves from the South West

Map of the

DELTA OF THE INDUS

to accompany the Paper by

Col. C. W. Tremenheere, C.B. R.E.

English Miles 5 10 15 20

Geographical Miles 5 10 15 20

Published for the Journal of the Royal Geographical Society by J. Murray, Albemarle Street, London, 1867.

Edw^d Weller

Between the boundaries thus indicated, the plain of the Indus will be seen to vary much in width. Its physical aspect is characterised by a very remarkable uniformity throughout, in the entire absence of channels for natural drainage, in its almost uniform slope both towards the sea and away from the river's banks, and in its mineral character. I have shown that the slope of the valley in a direct line to the sea is about 9 inches in the mile, and the lateral slopes on either side of the river are in many cases quite as much. The river throughout this portion of its course passes along a ridge, and is many feet above the land a few miles distant on either side of it. This vast plain is entirely composed of the finest silicious deposit mixed with a variable proportion of argillaceous matter and mica; some portions resist the action of the river better than others, but generally the banks are easily cut into. Such is the fineness of the soil, that neither in the bed of the stream nor in any portion of the plains is it possible to find a grain of sand so large as a pin's head.

The Indus, like other tropical rivers, is subject to annual inundation, the extent of which has been carefully registered for many years both at Sukkur and at Kotree. At the former place it generally rises from 12 to 13 feet above a fixed datum, assumed as its low or cold-season level; but the fluctuations of the river at this latter period are considerable at this point, the water having in some seasons fallen to more than 2 feet below the datum. The inundation level is, however, more permanent at Kotree. On the contrary, the level of the water is more permanent during the low season, and the fluctuations are greater in the inundation. In ten years the water was only four times below zero, and it twice reached 18 feet on the gauge at the height of the inundation.

The rise between February or March and the middle of June may be attributed chiefly to the melting of snow in the Himalayas, while that from 15th June to September is the result of the monsoon rains discharged on the southern slopes of the same mountains.

The amount of rainfall in Sind is so small that cultivation may be said to be entirely dependent upon the rise of the river. The whole country is intersected by a network of canals by which water is, during the inundation season, led to great distances, and for which the lateral and seaward slopes of the land afford great facilities. These canals are generally opened in the month of May, when the land is prepared for the crops, and the supply ceases in September. An early fall in the river is, of course, most injurious to the crops, but generally the supply may be considered as quite as reliable as that

derived from rain in those portions of India in which agriculture is dependent upon that source of supply.

The maintenance of these canals in a state of efficiency is under the supervision of Government officers, and both the revenue of the State and the prosperity of the cultivators is, of course, dependent upon the due performance of the duty.

Government are at the expense of clearing all the main channels, and have abolished the system of forced labour which existed under the previous Native governments.*

The amount of silt contained in the water of the Indus is remarkably great. From a series of careful observations made at Sukkur and Kotree, it has been ascertained that, at the height of the inundation, the solid matter in the water amounted to about 43·6 parts in ten thousand by weight, and at the end of December to 17 parts. The discharge of the river at the former period is about 380,000 cubic feet per second, at the latter 680,000 cubic feet. Assuming a mean discharge of 200,000 cubic feet per second, and the amount of solid matter at 25 parts in ten thousand, we should have 5866 million cubic feet of material carried to sea in the year, or 217¼ million cubic yards, sufficient to cover 70 square miles with deposit one yard in thickness. I am not aware that any observations have been recorded which show so great a proportion of silt in any other river. The details of the experiments, with a description of the method of collecting the water from different depths, and the subsequent operations, are given in an appendix.

The river flows in a very shallow bed, and the banks are generally ill defined. During the low season navigation is difficult for boats drawing four feet, and the course of the stream becomes more tortuous as the inundation subsides. During the low season the channels wind about between the large sand-banks formed in the bed of the river, and are in process of continual change. The stream appears, by an automatic action and with almost life-like instinct, to adjust its surface slope with each change in the amount of water which passes down. At this season the falling in of the temporary banks is constantly taking place.

The banks of the inundation period, though much more stable than those above described, are by no means permanent, and some towns and villages have been swept away and rebuilt

* There are four modes of irrigation in Sind:—1st. By the Persian wheel, where the water is below the level of the land. 2nd. By natural flow, when the water in the canal is above the land. 3rd. By wells drawn by Persian wheels. 4th. By distributing water derived from rain from the natural drainage channels which issue from the hill ranges. Much land which has been flooded during the inundation is also brought under cultivation, and bears good crops without further irrigation, and there is also some cultivation in parts after rain.

on other sites two or three times within the last twenty years. These banks are frequently below the level of the river at the height of the inundation, and the crest of the inundation wave is then spilt over them, the water passing down the side slopes. Extensive tracts of country are then occasionally flooded, and a very large amount of water escapes from the river, especially in that part of the left bank below the junction of the Sutlej with the Indus, in the Bhawulpoor territory. Such floods, after passing into the low country bordering the desert, have often found their way into the Eastern Narra, and after filling innumerable dunds (natural depressions among the sand-hills), spread over the uncultivated plains as far south as Nowacote, or even into the Run of Cutch. In other seasons the flood has extended from the right bank about Kusmore, and having covered the whole country between Shikarpoor and Jacobabad has reached beyond Kyree Ghurree to the west.*

It will be seen from the distances to which these floods extend, that although it is merely the crest of the inundation wave which is spilt over the banks, the body of water thrown over the country must be very great. The floods frequently cause great damage, not only to existing cultivation, but to public buildings. As they take place only when the inundation is nearly at its height, the supply is cut off as soon as the crest of the wave has passed, and, as the water spread over the country is absorbed, the ground, unless injured by excessive and repeated floods, affords excellent spring crops, which reimburse the cultivator for the loss he may have sustained by the destruction of the usual inundation crop. A succession of such floods, however, is found not only to destroy the land, but to make the cultivator disinclined to undertake the labour of preparing his land for the safer and more legitimate husbandry of the autumn crop. It has not unfrequently happened that in the expectation of a flood which did not occur, land has been left uncultivated, and the opportunity for putting in a crop has been entirely lost.†

The extensive sand-banks formed in the bed of the river are frequently many feet above the level of the water during the low season, and become quickly covered by a thick growth of young tamarisk; those which are not swept away by the next inundation, being thus protected from the action of the current on their surface, are gradually raised by successive deposits

* When the crest of the inundation wave sets with force against one bank of the river, the height of the water pressing upon that bank is considerably greater than that upon the opposite bank, and this determines the direction taken by the flood.

† These extensive floods are confined to the upper portion of the province.

of silt to the level of the high banks, and frequently become comparatively permanent islands bearing forest trees. The main banks, where they have not been cleared for cultivation, are also covered with a luxuriant growth of tamarisk and elephant-grass, or forest trees.

The heavily charged water which passes through this vegetation is deprived of its silt, which tends to raise the level of the bank, and the velocity of the water which escapes from the river is checked.

I have stated that throughout the large area occupied by the Indus Valley, the nature of the surface soil may be said to be identical from Mittee to the sea, and that the river occupies a ridge having a tortuous course of 540 miles, in a direct distance of 330 miles between those points; and I would remark here, that had it taken, like an ordinary drainage channel, the lowest ground, its course would have been materially shortened, and it would have passed down the still existing channel, called the Rhain, into the Eastern Narra, and by Nowacote to the Run of Cutch. These old channels are still of very considerable size, and it is an interesting question whether they indicate the course of the river at any former period.

The country between the Narra and the present river contains many remains of old channels, some of which extend for many miles continuously, and have well defined banks, with a glacis on each side. They have in many cases a very tortuous course, but are straighter as they approach the sea. There are so many of these old channels to the eastward of the present course of the river, while such marks are rare and indistinct on the right bank, that one is led to the conclusion that the river has gradually worked to the westward. There is unfortunately no authentic map of the Eastern Delta, or of the country south of Meerpoor, which shows the course of the old channels now referred to, which terminate in the Run of Cutch. It is possible that formerly the chief outlets of the river may have been by these channels, and that the accumulation of an enormous deposit, derived from the river, in the Run, in conjunction with an upheaval of that district, which there are grounds to believe took place in the year 1819 (Burns' Travels), may have forced the river to form new channels having more direct communication with the ocean, and thus to assume its present course.*

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* In Sir A. Burns' Travels into Bokhara, it is stated that previous to 1762 the Phooran, then a branch of the Indus, "emptied itself into the sea by passing the western shores of Cutch. Its annual inundations watered the soil," and afforded the means of irrigation. It is stated that the supply was not wholly cut off by an artificial embankment, but that in 1802 the Indus water was entirely excluded by

The completion of the survey of the Eastern Delta and the extension of the series of levels into the Run of Cutch will probably throw some light upon these subjects.*

It would, I think, be an assumption, for which there is no sufficient evidence, to state that the whole of this Indus plain has been regained from the sea by deposit from the river. The height of Mittee, 257 feet above mean sea-level, and the still greater height of places such as Mooltan and others further north, where the same general features are found, renders this more than improbable. But further it is to be observed that at Sukkur the river is crossed by a barrier of rock, the depth of water over which in the low season is only 5 or 6 feet. Between Kotree and Hyderabad, also, there can be little doubt that the rock on either side is connected at no great depth. At Jerruck rock appears on both sides of the river, and again on the line south from Tatta to Peerputta. There are thus indications that the actual depth of deposit at and near these points, at least, must be very slight; and it can hardly be supposed either that the sea ever extended far up the valley, or that the river can have gradually worked itself up its own glacis from a much

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the erection of another bund at Ali Bunder. In June, 1819, an earthquake occurred which raised a mound which passed entirely across the course of the Phooran, separating it from connexion with its former outlet into the sea; but this, as well as the artificial embankments, are said to have been forced by the large flood of 1826, which came down from Bhawulpoor and along the Eastern Narra, and ultimately reached the Run of Cutch. The Phooran is a well defined and large channel, across which several bunds have been constructed in the lower part of its course to retain water which enters it from the canals which tail into it from the main river as well as the Foolalee; but such bunds could not have been constructed until after the Phooran had ceased to derive a supply by direct communication with the Indus. This direct communication had therefore probably ceased at the first period above referred to, or at all events before 1802.—*Burns*, vol. i. pp. 309-315.

* Sir A. Burns describes the Run as extending about 200 miles in length, and about 35 in breadth, or occupying an area of about 7000 square miles. The whole tract may truly be said to be a "terra hospitibus ferox;" fresh water is never to be had anywhere but on islands, and there it is scarce; it has no herbage, and vegetable life is only discernible in the shape of stunted tamarisk-bushes. It differs as widely from what is termed the sandy desert as it does from the cultivated plain. It has been denominated a marsh by geographers, which has given rise to many erroneous impressions regarding it. It has none of the characteristics of one; it is not covered or saturated with water but at certain periods; it has neither weeds nor grass in its bed, which, instead of being slimy, is hard, dry, and sandy, of such a consistency as never to become clayey unless from a long continuance of water on an individual spot, nor is it otherwise fenny or swampy. It is a vast expanse of flat, hardened sand, encrusted with salt sometimes an inch deep (the water having been evaporated by the sun). The natives of Cutch, Mahomedans as well as Hindoos, believe that the Run was formerly a sea: they point out at this day different positions said to have been harbours. The Run has communications with the sea both on the east and west by means of the Gulf of Cutch and a branch of the Indus, and it is flooded from both these openings as soon as the south-westerly winds set in about April each year; the greater portion of the Run is thus annually flooded.

lower level, and surmounted such a rock barrier as that at Sukkur, as must have been the case had its original course been much either to the east or the west of that point.

I believe that hitherto no adequate explanation has been given of the oscillation of rivers in their courses. Why, for instance, does the Indus in passing down an incline which may be considered perfectly regular between the two extreme points herein referred to, 330 miles apart, assume a course 540 miles long? I am aware that Mr. James Fergusson, in his 'Notes on Recent Changes in the Delta of the Ganges,' has suggested a theory the result of which, if I correctly understand his meaning, would be that the flatter the country through which a river passes, the sharper would be the curves. I believe this to be contrary to fact, and that the only explanation which can be given of the subject is that a river discharging itself down any continuous slope, in a soil capable of being acted upon by it, must assume such a course and section as may enable it to adjust its surface slope to every variation in its section or body of discharge at each season of the year. It is obvious that the channel of such a river as the Indus, passing through a country consisting of material so easily acted upon as that upon its banks, could have no permanence if its course were materially shorter and its surface slope greater than that it has assumed.

I would also point to the fact that, during the inundation when carrying a large body of water, the course of the Indus is more direct than in its low state, when the water not only follows the course of the larger reaches of the river, but winds from side to side, or round the extensive sand-banks within its wide channels, thus adapting its surface slope to suit the small and ever-varying amount of discharge at that season. Should my views on this subject be correct, it would result that the larger the body of water and the less the surface slope of the country, the more direct will be the course of a river; and, on the contrary, the sharpness of the bends of a large river passing down a plain would indicate the existence of a considerable slope in the country. I should, in this manner, infer that the valley of the Tigris between Bagdad and the marshes north of Kornah has a more considerable slope than that of the Indus. The general statement I venture to make is, that with a fixed or virtually fixed maximum discharge and an ascertained difference of level between any two points on a large river passing through an alluvial plain, the length of its course is also absolutely fixed. The longer, therefore, a river becomes by extending its delta to seaward, the greater tendency will there be to assume a more direct course.

I have stated that the boundary of the valley of the Indus on

the eastern side is the Thurr or Desert, and it is desirable that I should describe it.

In mineral character portions of this district differ very little from the great plain of the Indus: other portions consist of pure siliceous white sand, but the district has everywhere been raised into ridges and low hills, which are very remarkable as having a north-east strike over a very large area. The valleys or depressions between the hills have frequently no outlet or communication with each other, and are at a very low level. Where wells have been dug in these basins, water is found only at great depths. The height of these hills increases towards the south, and there are more distinct indications of the existence of a soft and very friable sandstone formation below the surface. The remarkable similarity of the surface of a large extent of this desert with that of the Indus plain would indicate that the formations are identical, the desert portion having been subject to upheaval by a force acting in north-east and south-west lines; hitherto no levels have been extended into this district.

Whatever may have been the position of the Delta of the Indus in former times, and there are grounds for supposing that it has been considerably more to the eastward, it must now be deemed to commence at some distance to the south of Tatta. It will be seen that only two branches leave the river from the right bank, the Buggaur and Hujjamree. The first, now a small channel, not more than 80 yards in width during the inundation, discharges its water after a very winding course into what must be considered as a large lagoon extending from the vicinity of Kurrachee to the main embouchure of the river; the second, the Hujjamree, carries off a large body of water, about one-third of that in the main stream. It passes by a winding course to the sea, and its mouth affords the best navigable entrance for trading-vessels; it is indeed the only entrance now used; and the town of Khetty, situated on it, was the chief port of Sind for the trade with Bombay, and generally for all trade carried on by native coasting-vessels, until the construction of the railway, joined with the high prices, the result of the American war, enabled the merchant to divert the traffic in cotton, wool, and such other articles as would bear the extra charge of transport, to Kurrachee.

There are also only two delta channels which leave the Indus from its west bank—the Mootnee and the Mull; both of these diverge from the river below the point at which the Hujjamree takes off. The left bank delta has not yet been properly surveyed, and very little is known of this district even by the revenue officers.

The western delta has very recently been surveyed by Captain Macdonald. The coast will be seen, by the map, to extend in nearly a straight line from the mouth of the Hujjamree to the entrance of the Kurrachee harbour, and is formed by a line of sand-bank topped by low dunes.

The coast is extremely flat, and the extent of shore left dry at low tide very considerable.* Behind the screen formed by the coast-line, there is a very large area of marsh-land permeated in every direction by tortuous creeks and channels, the tidal water to supply which is derived from a number of wide but shallow passages or openings in the coast-line. These openings have been most improperly called mouths of the Indus; but it is obvious that they are in fact merely passages for the tidal water to and from the lagoon. From their connexion with each other, by means of the large creeks within, a safe navigable canal is afforded during the monsoon season to the steamers which ply on the Indus between Ghizree, close to Kurrachee, and the river, when such vessels are quite unfit to make the direct passage from Kurrachee to the river-mouth. Within the lagoon the channels are well defined, though very tortuous, and deepen gradually as the distance from the Indus increases. The soundings in those to the northward are as much as 3, 4, and $4\frac{1}{2}$ fathoms at low water, at many miles from the sea. The mud-banks within this lagoon have now been raised nearly to the level of ordinary high-water mark, by deposit of salt mud on which mangrove and soda-plants are the only vegetation. This mud is blue-black in colour and very fine; but, when dried, it becomes of the same light-drab colour as the Indus mud.

The bay and harbour of Kurrachee is situated at the extreme northern end of this delta. The bay is formed by Munora point, a natural hill, consisting of clay beds capped by conglomerate, at the southern extremity of a reef about 10 miles in length, by which it is united to the mainland, and on which the action of the surf, which breaks directly upon it, has formed a beach, capped by a narrow ridge of blown sand. The opening of the bay between Munora and Clifton is about $3\frac{1}{2}$ miles wide, but this opening is blocked by rocky islands in the centre, and by the island of Keamaree at some distance in the rear. The entrance to the harbour, and the only navigable channel, is close to Munora, the anchorage extending from within the shelter of that point to the western end of Keamaree. With the exception of this comparatively deep portion, and two branch channels of no great extent, the whole space within presents at low water

* The map shows the line of high water only.

an area of extensive mud-flats, some of which are covered by mangrove-bushes. The tidal area is generally at a level of 6 or 8 feet above low water, or from 1 to 3 feet below high water at spring tides. The surface consists of a layer from 3 to 6 feet thick of stiff, black mud, formed of silt mixed with decayed vegetable matter, lying on a bed of sand of variable quality, in some places fine and very thick—a quicksand, in fact—in others coarser, containing sea-shells or approaching gravel. The whole overlies a bed of stiff blue clay, which appears to be the natural surface. The superficial deposits extend to from 9 to 25 feet *below* low-water mark.

On a careful examination of these superficial deposits, it has been found that the stiff black mud, mixed with vegetable matter, is identical with that found on the mud-banks within the lagoon, which has been already described. Its mineral character, as well as that of the fine sands below it, and the whole of the surface of Keamaree, is marked by the presence of a very fine white quartz, mixed with a large proportion of mica, and is thus identical in composition with the silt carried to sea in the waters of the Indus.

The presence of mica within Kurrachee Harbour must be regarded as affording a strong presumption that the deposit within its area is derived from the Indus. I have examined the sands in the minor drainage channels, which discharge into the sea between the mouth of that river and Sonmeanee, and from several places on the Mekran coast, and found them all characterised by the entire absence of this mineral. It does not exist on the Mekran coast, where the set of the current is to the eastward, and I can see no escape from the conclusion that it is swept up the coast from the mouths of the Indus.

The agency by which this is effected will be easily understood by referring to the map of the coast-line.

The south-west monsoon breaks upon this coast early in May, and lasts without cessation until September, during the whole of which period a heavy surf beats upon the shore. It is precisely during this period that the Indus is discharging its flood-waters so heavily charged with sand and silt. The direction in which the surf breaks upon the coast is marked upon the map by a series of parallel broken lines, which form a considerable angle with the general coast-line. The result of this oblique action of the sea-stroke, even upon coasts which are not subject to winds which prevail continuously for any long period, is not only to force any matters held in suspension in the water in the direction of the stroke, but, as shown by Sir H. De la Beche in the extracts appended, to produce a shore current.

"Though, for convenience, the Mediterranean has been treated as a tideless sea, and without motion, this is not strictly correct, inasmuch as small tides are felt in it, and currents are found. Indeed, as respects the latter, when powerful winds by their friction force the surface waters in some given direction for the time, well seen where driven against any part of the boundary coasts,* the movement is then sufficient to carry any substances, mechanically suspended, to distances proportionate to the power and continuance of the winds."—P. 82.

For many miles to seaward the depths of the Indus coast are within 8 fathoms, and the 4-fathom line extends from Munora Head in almost a strait line nearly parallel to the coast.

"The observer has now to consider the distribution of fine matter in mechanical suspension by means of ocean currents. Some of these are known to be very constant in their courses, others periodical, and many temporary. We have seen that the pressure of strong and long-continued winds forces up water by their friction on its surface in tideless seas, and consequently would expect that in the open ocean similar winds would force water before them, though the absence of land would produce a modification in the result. When the area so acted upon was bounded by a single range of coast, the modification would be less; and when two lines of coast presented themselves between which the water could be forced and lateral fall prevented, there would be an approximation to the effects observable at the north and south extremities of the Caspian, or on the east and west shores of the Black Seas, where the waters are pressed forward by the needful winds."—Pp. 106, 107.

"With respect to temporary currents, they are found to be innumerable; severe gales of wind of long duration readily force the surface water before them. Among channels and along coasts these are chiefly felt: the two boundary shores or the single coast opposing the further rise of water and throwing them off in the manner of tidal waves."—P. 110.

"When detrital matter is thrown into the tides it is borne to and fro by them according to their flow and ebb; and the observer will have abundant opportunities of seeing on the coasts of the British Islands and on the ocean shores of Europe, that the river waters when swollen by rains bear outwards with the ebb, and in the direction it takes along shore much mechanically suspended detritus, which does not again enter the rivers unless under very favourable circumstances. As a whole, much fine detritus thus derived is carried coastwise by the ebb, and accumulations are formed of it if there be sufficient continued repose in that direction; so that, should a sheltering headland run out and a bay be formed between it and the embouchure of the river, there is a tendency to deposit the finer sediment in the locality so sheltered."—P. 100.

The manner in which beach material is swept along a coast in the direction of the sea-stroke is well illustrated in figs.

* An observer may often have opportunities in the ports of the Mediterranean of seeing the rise or depression (as the case may be) of the sea, according as the winds at the time may be blowing with strength off or on shore. Canals frequently afford good opportunities of observing this kind of action of wind on water, for the canal levels in still weather being accurately known, it becomes easy to see how much these waters are raised or depressed as the winds may press them in one direction or another. Mr. Smeaton found that in a canal four miles in length, the water was kept up four inches higher at one end than at the other by the action of the wind along the canal. The Caspian Sea is several feet higher at either end, according as a strong northerly or southerly wind may prevail.

53 and 54, pp. 66 and 67, of the same book. It is obvious that in fig. 54 (Fig. 1, *below*), not only has the beach, *b b*, travelled from *g*, and been spread along the whole intermediate space between *g* and *c*, but whenever the winds blow for any length of time in the direction marked by the arrows, there must be a continuous movement of materials in the same direction; and should there be a bay beyond *c*, in which the material can find shelter and repose there, accumulation must take place.

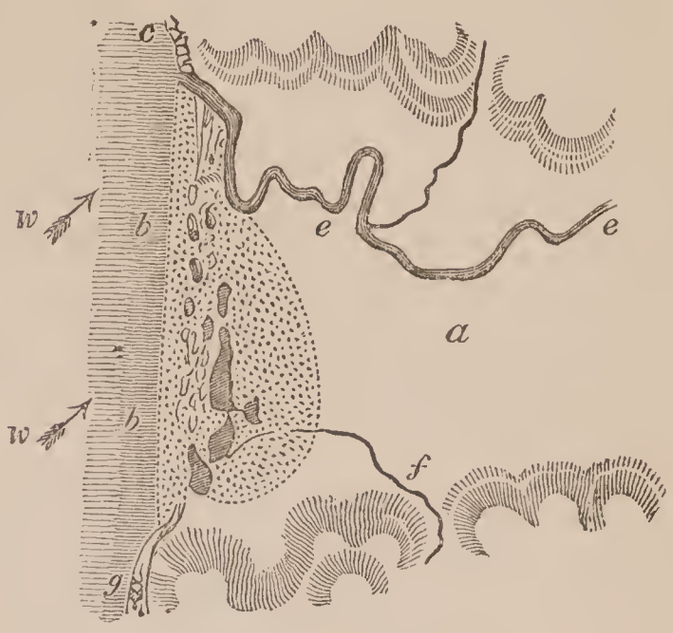


Fig. 1.

The manner in which the deposit in the lagoon, and within Kurrachee harbour has been formed, is extremely well described in the last of the above extracts from Sir Henry De la Beche, and it would appear that the whole shore-line between the mouths of the Indus and Munora has been formed by the action of the sea-stroke forcing the sand and silt discharged by the river in the direction of Kurrachee Harbour.*

In July, 1865, a steamer was sent down the river to the mouth of the Kujamree, and anchored within the bar, but as far out as she could lie with safety. 860 pint bottles corked, wired, and weighed to float as low as possible, were thrown overboard at intervals between 8 A.M. and 5.10 P.M. on the 27th July; 61 of these were found on the beach of Clifton, close to Kurrachee, by 1.31 P.M. on the 29th, but these were ascertained to have been 47 hours in transit; and the direct distance being 49 miles, it may, perhaps, be assumed that the assistance of a current in this direction, amounting to 1 mile an hour, was thus proved.

By the 4th August 214 bottles had been picked up, either on Clifton Beach or within Ghizree Creek. With so strong an indraft into the numerous openings to the Lagoon as must

* Large quantities of driftwood, consisting of branches of trees known to grow on the banks of the Indus, are cast on shore at Clifton and Keamaree, and carried into the harbour during each monsoon. The coast is so shallow, and the surf beating upon it is so heavy during the monsoon, that no vessel can approach it from seaward, and it is therefore difficult to test the existence of a coast current by actual experiment.

exist along the whole of this line of coast, a great many of the bottles were doubtless prevented from reaching so far to the north, and the above number, which were found, may be deemed as large a proportion as could be expected; but in addition to the indraft, the bottles floating at the surface were exposed on approaching the coast to the force of the surge, and would necessarily partake in the motion of the breaking crests, and be driven leeward; they are not, therefore, a fair indication of the course taken by the sand and silt held in suspension, and diffused through the whole body of the water.

In this manner the circumstance that none of the bottles were found either within Kurrachee Harbour or on Keamaree may be explained.

From the action of the coast current, whose existence may now perhaps be assumed as proved, there must be a considerable banking-up of water during the monsoon within Kurrachee Harbour. I have called attention already to the position of the Island of Keamarree, and have stated that it is composed entirely of fine sand; the portion above high-water mark consists entirely of blown sand derived from its own shore. At many feet below low-water mark its composition appears to be the same, and the whole must, I believe, be regarded as a deposit from the sea, due to the banked-up water in the harbour deflecting the coast current, and throwing it off towards Munora Head in the manner I have endeavoured to exemplify by the arrows in the appended sketch. Should this view be adopted as correct, the existence of the island in its present form and position may be considered as a further illustration of the existence of the coast current.

I have stated that both in the Lagoon and in Kurrachee Harbour the superficial black mud is mixed with a large quantity of decayed vegetable matter. A large quantity of a very dark brown vegetable fibre, in a fine state, is deposited each monsoon in any sheltered spots, such as on either side of a stone groin which has been carried out from Keamaree towards Munora; this, when first deposited, is so soft that a man walking on it sinks to his knees. On examining specimens of this material, and of the more solid matter from within the harbour, Dr. Robert Haines, chemical analyser at Bombay, wrote:—"What I think may be taken as quite certain is that the vegetable matter is not the remains of any phanerogamous plant, the structure is entirely cellular, even the bundles of apparent fibres in the larger masses are mere aggregations of elongated cells."

The first specimen sent had been washed and dried; subse-

quently a mass of wet mud, 3 inches cube, was sent in a tin box. Dr. Haine's report on it was thus given :—

"It confirms for the most part my first opinion, except that the fragment, which in the dried state of the first specimen I took for minute fronds of smaller sea-weeds, are now seen to be the loosely aggregated fibres which make up the so-called stem of a larger sea-weed. The bundles of fibrous matter, where they have not been disturbed, are held together by a brown membranous tube, a sort of skin, comprised of very regular elongated cells bevilling into each other at the ends. The fibres are flat and very thin, composed of cellular tissue. This is exactly the structure of a sea-weed stem, the still looser half mucillaginous, intermediary cells having rotted and dissolved away and left the tissues separate. I found one small fragment of an exogenous branch embedded in the mass. I have not a doubt of the whole being a marine littoral deposit. The fragmentary state of the vegetable matter forbids the supposition of its having grown *in situ;* it appears to have been deposited with the mud in its present broken state."

From the above description it is evident that the large deposit of black mud, mixed with sea-weed and mica, has been swept into Kurrachee Harbour and into the Lagoon by the tides, and by the current which sweeps up the coast at the very time when, owing to the heavy surf breaking upon the coast, a vast quantity of sea-weed must be broken up and swept away.

The lift of the tides on this coast varies from 8 to 11 feet at springs; their course is in a direction parallel to the coast-line, the flood-tide coming from the north-west and the ebb running in the opposite direction. During the monsoon months there is a strong set in the offing to the south-east, or in a direction contrary to that along the shore of the Lagoon, which is entirely local. Both currents are produced by the same cause, the action of the long-continued sea-stroke on a coast-line forming a considerable angle with the crests of the monsoon waves. (See Map, on which the probable course of the two currents is indicated by arrows.) By the action of the current in the offing it is probable that much silt, which has been swept to the northward as far as Kurrachee Harbour, may be again carried to the southward, and be perhaps eventually deposited in the eastern delta channels or carried into the Run of Cutch.*

The action which I have endeavoured to trace must have a considerable influence in checking the growth of the delta to seaward, the surface of each successive monsoon exerting its immense power in the removal of any deposit which would otherwise tend to extend the banks by which the main channels

* See note, p. 73. It seems highly probable that the enormous deposit in the Run may have been derived from the Indus.

discharge into the ocean. The progress to seaward is thus dependent upon the advance of the whole coast-line between the mouths of the river and Ghizree, a process which must be extremely slow.

In Mr. Fergusson's 'Memoir on the Delta of the Ganges,' a remarkable depression in the bed of the sea, called "the Swatch," is noticed, and its existence is attributed to the meeting of tidal waves proceeding from opposite directions. A depression very similar in character exists off the mouths of the Indus, and called by the same name on the Charts. In this case it cannot be caused by any action of the tides; it is merely a natural gorge or narrow valley extending between two banks, and communicating directly at its southern extremity with the deep ocean. The two banks are themselves on different levels—that to the eastward having 14 to 16 fathoms, while the western bank has 45 to 50 fathoms. The soundings within "the Swatch" are irregular, varying from 100 fathoms to 160 and 200 fathoms, with no bottom. The line upon the Chart, intended to show the limit of 100 fathoms, may be considered as marking the crest of a submerged plain, beyond which there is a rapid increase in depth. This crest appears to maintain a course nearly parallel to the general coast-line along the whole of the Mekran coast.

APPENDIX.

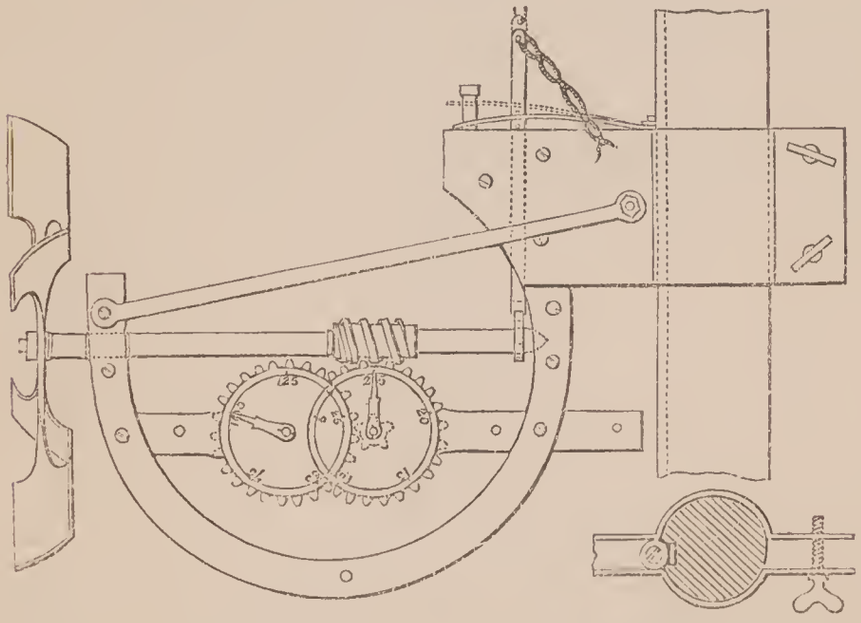
Description of the Mode adopted in taking Observations to determine the velocity of the Indus, and the amount of solid matter in its Water, at different depths.

Fig. 1 represents the instrument used for taking the velocities, which was a modification of Woltman's Mill. It was fitted to a round pole, or piece

FIG. 1.

INSTRUMENT FOR MEASURING THE VELOCITY OF THE CURRENT IN THE RIVER INDUS AND CANALS IN SIND.

Reduced to one-fourth the size.



of iron gas-pipe about 16 feet long, having an iron cross-head fixed to the top to show the axis of the instrument, which could thus be made to correspond with the direction of the surface-current. The correctness of the instrument had been previously ascertained by trials; the number of revolutions made by the vanes in a measured distance when dragged through still water, at various velocities, was found in each case to correspond.

The observations were taken from a boat, either fastened to the bank or anchored in the stream. The instrument was clamped to the rod at the required depth. As soon as the pole was in an upright position, with the cross-head in the proper direction, the trigger was pulled. The vane was usually allowed to revolve for 30 seconds, when the trigger was dropped, and the result registered by the index recorded. The observations were in every case repeated; no single observation was relied on; and whenever there was any material difference between two experiments, the observations were continued.

In very strong currents, and at any considerable depth below the surface, the instrument gave readings which varied considerably from each other: this was owing to the difficulty of holding the rod in the direct line of the current,

and to its vibration; but even in such case it was not difficult to obtain reliable results, as may be illustrated by the following observations:—

No. of Observations.	Revolutions.	No. of Observations.	Revolutions.
1	183½	5	194
2	226	6	204
3	233	7	233
4	225		

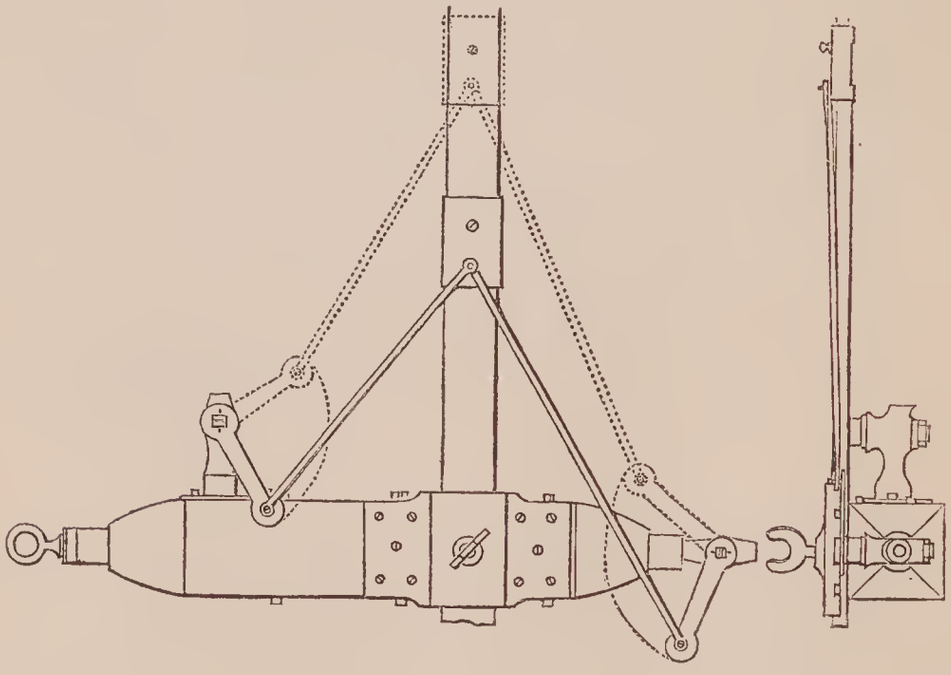
It may, perhaps, be taken for granted that the 2nd, 3rd, 4th, and 7th are nearly correct, and that the instrument was not held quite in the direction of the current in the other experiments. The mean of the above four gives 229 revolutions, equivalent to 9½ feet per second, or very nearly 6½ miles an hour.

In every case the observations for velocity were taken first, and then the samples of water were drawn from corresponding depths. The apparatus employed to effect this is shown in Fig. 2. The iron rod on which the bottle

FIG. 2.

BOTTLE FOR TAKING WATER FROM BELOW THE SURFACE, TO ASCERTAIN THE QUANTITY OF SILT.

Reduced to one-eighth the size.



could be fixed at any required height above the foot was 14 or 16 feet in length. The valves or cocks were worked by strings fastened to the brass slide, and passed over pulleys at both ends of the rod. The water so drawn was at once put into bottles, arranged in order in a box made for the purpose, and the whole then carefully filtered. The filters, previous to use, were adjusted in the usual manner, and with the deposit, were thoroughly dried on a sand bath, and weighed in opposite scales. The quantity of water was accurately measured in the usual graduated glass measures, and the specific gravities were obtained by means of the specific gravity bottle.

An examination of the recorded velocities at different depths will show that some confidence may be felt in the correctness of the observations with the

instrument employed. With respect to the variation in the proportion of silt at different depths, the facts prove that the material in suspension is not distributed in any exact proportion to the depths and velocities. Taken as a whole, however, the results show but few of these anomalies. In the Sukkur observations, the proportion of salt increases with the depth with considerable regularity, though here also a few exceptions occur.

The mean result of the observations at Kotree, in November, is that the quantity of silt amounts to 1-672nd part of the water by weight; but as no observations could be taken where the river was deepest and most rapid, this fraction is too small to represent the proportion in the whole discharge of the river. The observations taken at Sukkur, in December, give the proportion 1-516; but this again, owing to the access of flood-water during the experiments, gives too large a value, and I am disposed to adopt as an approximation 1-550 or 1-600, say 16·6 parts in ten thousand as the proportion of silt by weight in the whole discharge of the river during the low season, or somewhat less than half that contained in it during the height of the inundation, viz., 43·6 parts in ten thousand.

It may be observed that the actual quantity of sand and silt moving forward with the current at any one time must be the same in each section of the river. The rule which is applicable to the uniform discharge of water in different river sections must apply equally to the solid material held in suspension. Where the velocity is exceptional, as in the narrow pass at Sukkur, the water and sand are more intimately mixed, and the surface-water will contain a larger proportion of sedimentary matter than elsewhere; but the total quantity of solid matter is no more affected by the additional velocity than is the volume of water discharged by the river.

RECORD of OBSERVATIONS to ascertain the amount of SILT contained in the Water of the INDUS during both the Inundation and the Low Seasons, made in the months of July, August, November, and December, 1864.

Date.	Site.	Gauge.	Depth of Water.	Depth from Surface.	Velocity per Second.	Quantity of Water.	Deposit on Filter.	Proportion of Silt to Water.	Specific Gravity of Silt.	
1864.		′ ″	′ ″	′ ″		lbs. ozs. dwts.	Grains.			
July 23 ..	Sukkur	10 11	10 0	6 10	9·5	2 2 5	62	1/244		
						1 1 1½	36	1/208		
						0 14 0	26	1/235		
						4 1 6½	124	1/232		
,, 25 ..	Ditto	11 4	8 6	6 10	3·5	2 0 0	50	1/280		
						1 13 0	51	1/248		
						1 15 0	47	1/288		
						5 12 0	148	1/272		
,, 27 ..	Ditto	11 8½	8 9	3 9	4·58	2 4 2	72	1/220		
						2 2 6	75	1/202		
						1 13 4	63	1/204		
						6 4 4	210	1/209		
,, 28 ..	Ditto	11 11	9 2	6 2	4·2	2 2 3¾	64	1/235		
						1 12 1½	51	1/241		
						2 3 3	85	1/182		
						1 12 2	70	1/176		
						7 14 2¼	270	1/204		

,, 29 ..	Ditto	11	11	12	0	10	0	3·1	1	14	0	57	1/230		
									1	9	6	73	1/154		
									2	4	0	70	1/225		
									2	4	4	78	1/204		
									8	0	2	278	1/202		
August 1 ..	Ditto	12	2	8	6	6	6	2·6	2	3	3	62	1/249		
						4	6	3·2	2	3	3	59	1/262		
						2	6	4·0	2	2	$6\frac{1}{3}$	47	1/317		
						1	0	4·2	2	3	3	50	1/309		
									8	12	$1\frac{1}{3}$	218	1/281		
,, 3 ..	Ditto	12	$3\frac{1}{2}$	9	6	7	6	3·8	2	3	0	62	1/247		
						5	6	4·1	2	0	0	65	1/205		
						3	6	4·6	1	12	3	49	1/253		
						1	6	3·5	1	8	0	39	1/269		
						0	6	3·9		..		..	..		
									7	7	3	215	1/242		
,, 9 ..	Ditto	13	0	8	6	6	6	3·6	1	13	$2\frac{3}{4}$	47	1/272		
						4	6	4·1	2	0	5	50	1/288		
						2	6	5·2	1	4	$4\frac{1}{2}$	26	1/346		
						0	6	5·4	2	1	0	48	1/300		
									7	3	$4\frac{1}{4}$	171	1/295	2464	

RECORD of OBSERVATIONS to ascertain the amount of SILT contained in the Water of the INDUS, &c.—*continued.*

Date.	Site.	Gauge.	Depth of Water.	Depth from Surface.	Velocity per Second.	Quantity of Water.	Deposit on Filter.	Proportion of Silt to Water.	Specific Gravity of Silt.	
1864.		′ ″	′ ″	′ ″		lbs. ozs. dwts.	Grains.			
August 3 ..	Sukkur	12 $3\frac{1}{2}$	11 0	8 6	About 4·0	13 3 0	449	1/205		
,, 9 ..	Ditto	13 0	11 0	10 0	..	13 12 $4\frac{1}{2}$	455	1/212	2688	
						26 15 $4\frac{1}{2}$	904	1/208		
July 28 ..	Centre of river	11 11	50 to 90 ft.	11 9	Not observed	2 4 0	75	1/210		
			Total at Sukkur ..		.. .. ..	84 11 $3\frac{5}{6}$	2613	1/227	..	Mean for Inundation period.
December 24	Sukkur	0 7	7 6	5 6	1·75	2 14 $3\frac{1}{2}$	38	1/534		
				3 6	1·95	2 13 $1\frac{1}{2}$	20	1/988		
				1 6	2·06	2 15 0	20	1/1028		
					2·08					
						8 10 5	78	1/777		
,, 26	Ditto	1 1	7 3	5 3	4·27	2 11 $4\frac{3}{4}$	22	1/821		
				3 3	4·57	2 3 0	20	1/765		
				1 3	5·03	2 15 $2\frac{1}{2}$	23	1/809		
				Surface	5·03	2 3 $2\frac{1}{2}$	16	1/965		
						10 1 $1\frac{3}{4}$	81	1/870		

,,	27	Ditto	..	..	1	8	9	8	7	8	4·86	2	2	5	38	1/398
									5	8	5·5	2	3	2	36	1/428
									3	8	6·26	2	6	0	33	1/503
									1	8	6·47	2	3	0	35	1/437
												8	14	7	142	1/440
,,	28	Ditto	..	..	2	0	9	0	7	0	5·16	2	5	6	90	1/183
									5	0	5·5	2	5	$6\frac{1}{2}$	60	1/275
									3	0	6·72	2	6	0	45	1/369
									1	0	6·93	2	6	0	44	1/378
												9	7	$4\frac{1}{2}$	239	1/277
	29	Ditto	..	..	1	11	7	4	5	4	5·54	2	3	$4\frac{3}{4}$	36	1/432
									3	4	6·21	2	5	7	36	1/460
									1	4	6·80		..		..	..
									0	4	6·80	3	3	3	39	1/576
												7	12	$6\frac{3}{4}$	111	1/492
,,	30	Ditto	..	..	1	7	8	5	6	5	4·07	2	6	0	35	1/475
									4	5	4·74	2	6	0	33	1/503
									2	5	4·87	2	5	6	$30\frac{1}{2}$	1/541
									0	5	5·12	2	3	3	21	1/737
												9	5	1	$119\frac{1}{2}$	1/546

RECORD of OBSERVATIONS to ascertain the amount of SILT contained in the Water of the INDUS, &c.—*continued.*

Date.	Site.	Gauge.	Depth of Water.	Depth from Surface.	Velocity per Second.	Quantity of Water.	Deposit on Filter.	Proportion of Silt to Water.	Specific Gravity of Silt.	
1864.		′ ″	′ ″	′ ″		lbs. ozs. dwts.	Grains.			
December 31	Sukkur	1 4	7 3	5 3	4·03	2 0 0	26	1/537		
				3 3	4·62	1 5 2	28	1/332		
				1 3	5·16	1 8 6	17	1/637		
				0 3	5·29	2 2 0	20	1/743		
						7 0 0	91	1/538		
1865.										
January 2..	Ditto	0 10	2 6	0 6	2·66	2 2 6	20	1/760		
			2 11	0 11	4·04	3 0 0	29	1/724		
				Surface	·19	2 3 5	21	1/742		
						7 6 3	70	1/739		
			Total at Sukkur			68 10 5	931½	1/516	..	= ·00148 mean for Low Season.
1864.										
November 23	Kotree	3 2	13 0	11 0	1·68	3 1 5	27	1/804		
				9 0	2·16	3 0 4	29	1/734		
				7 0	2·37	3 0 1½	26	1/810		
				5 0	2·62	..	..	..		
				4 0	..	3 1 6	32	1/895		
				3 0	2·68	..	..	..		
				1 0	2·73	..	..	..		
						12 4 0½	114	1/768		

,,	24	Ditto	3	$0\frac{1}{2}$	14	0	12 0	1·85	3	0	3	25	1/846		
							8 0	2·52	3	0	5	46	1/462		
							4 0	3·06	3	1	$7\frac{1}{2}$	34	1/642		
							Surface	3·48	3	2	3	28	1/787		
									12	5	$2\frac{1}{2}$	133	1/654		
,,	25	Ditto	3	0	14	0	12 0	..	2	13	2	37	1/535		
							8 0	..	3	1	0	30	1/714		
							4 0	..	3	3	$1\frac{1}{2}$	33	1/678		
							Surface	4·7	2	1	6	20	1/738		
									11	3	$1\frac{1}{2}$	120	1/653		
,,	26	Ditto	2	11	16	0	14 0	1·38	3	0	0	24	1/875		
							10 0	1·85	3	1	5	27	1/804		
							6 0	2·22	3	1	$4\frac{1}{2}$	28	1/774		
							2 0	2·22	2	15	0	25	1/822		
							Surface	2·56		..		..	..		
									12	2	$1\frac{1}{2}$	104	1/817		
,,	28	Ditto	2	$10\frac{1}{2}$	15	0	13 0	Variable	2	15	0	45	1/457		
							9 0		3	0	$4\frac{1}{3}$	40	1/530		
							5 0		3	1	$4\frac{1}{4}$	44	1/492		
							2 0		2	15	4	24	1/866		
									12	0	$4\frac{1}{2}$	153	1/550		
					Total at Kotree				59	15	$2\frac{1}{2}$	624	1/672	..	= ·00149 mean for Low Season.

IV.—*Notes of a Journey from Bida in Nupe, to Kano in Haussa, performed in* 1862. By Dr. W. B. BAIKIE, R.N. Extracted from portions of Dr. Baikie's Journals in the possession of the Foreign Office, by J. KIRK, Esq., M.D.

Read, January 14, 1867.

IN December, 1861, Dr. Baikie left the settlement he had formed at the confluence of the Niger and Binue, and went to Bida, the capital of Nupe, a town of great size, to the north of the Kworra, from which it is distant about 16 miles.

It was not before the month of April that arrangements for the journey were completed, pack-oxen bought, and the jealousy of native traders overcome. On the 12th of April, 1862, Dr. Baikie set out in company with Ibrahim, a native of Zariya, then returning with presents from King Massaba to his Chief. The first was a short march of 9 miles to Kpakpagi, over level wooded country. Next day, many towns of considerable size were passed, and the boundary of the kingdom of Nupe crossed. They slept at Lemu, inhabited by Gbari, a heathen race, who on the arrival of the travellers were celebrating a pagan festival.

On the 14th they came to Tsiji, which overlooks the valley of the River Kaduna. The country passed consisted of low undulating plains, with sandstone ridges, covered with grass, bush, and forest. The meadow in front was clothed with grass and a few large trees scattered here and there, in which the people had placed bee-hives made of basket-work. Heavy rains, which fell in the night, inundated the plain and detained the party the following day.

On the 16th, crossing the alluvial valley, they reached Gbogi. On the banks of the Kaduna, outside the town wall, a steep descent of 50 feet leads to the water, which had already risen a foot from the early rains. The middle channel, which was 6 feet deep, was crossed in canoes, which occupied until 3 in the afternoon; then, crossing the plain diagonally in a north-easterly direction, they left the valley and ascended a gentle slope with dense bush and forest. They spent the night at a town of the Bassa people, from which an extensive view was obtained over the flat monotonous landscape. These Bassa are part of a wild turbulent race, living in isolated communities. They are for the most part heathen, but practise circumcision. At the foot of a sandstone ridge, on which the town was built, there lay a pool of water, to which after dark Dr. Baikie went to wash, but found on his return that it was full of crocodiles, fed and worshipped by the pagan inhabitants of the place.

17*th April.* After crossing several sandstone ridges clothed

Map to accompany Notes of a Journey

FROM BIDA IN NUPE, TO KANO IN HAUSSA;

Performed by

Dr. W. B. Baikie, R.N.

1862.

5 10 20 30 40 50 60 70 80 90 100

English Miles

This Map has been reconstructed from Dr. Baikie's Original Journal in the Foreign Office and founded upon some additional Latitudes and Longitudes — J.A.

Koton-koro ○ — Dr. Baikie's Route is Coloured

H A U S S A

Z A R I Y A

K A T S I N A

Y a u r i

Z A M F A R A

R U M A

Z E G Z E G

Gbari

Z O Z O

D O M A

Bassa

N U P E

B O L O B O L O

B A U C H I

S h i r a

Wasa ○

Dawanó ○

KANO ○

Yasserawa

Madari

R. Tanagar

Goayan

Dawakin

Sokwa

R. Mallam

Girko

Goza

Kafin

Madobi

R. Armeti

Dan Malaki

Dan Serina

Lajawa

Gatya

Katsa

Dutsi

Flows to L. Chad

R. Shashun

Bunuwa

Sangaiya

Takai

R. Dunduru

Hunan Wil. Elbeck

Koka

R. Kunza or Dunduru

Bebeji

Gaffan

Rano

Dell

Sata

Kura

Kuki

Gedia

R. Gedia

Dan Sesiya

Bauda

R. Mastana

Faki

Antsan

R. Mahuni

Guvimi

Kotokoro

Likoro

Sike

Katsena Hills

Tukur-tukur

Muzai

Rakama

Fatika

Karkasa

R. Bai

Kuzuntu

Zintu

Gatas

Rano

Wautora

Makama

R. Makama or Akra

Libere

Egabbi

Turanku

Zango

Rabbu

Rabban

Dawaki

Kauru

Kaduna R.

Kasabo

Kadara

Kerrin Yariba

Kuttup

Jeri

Kuji

R. Guirara

Darroro

Kogom

Kateri

Kogaro

Toni

Ishe

Bagaji

Likoro

Kulgu

Mada

Keffi-n-Abdezenga

Godondara

Goagallada

Tamma

Abaje

Dogeri

Oaobe

Gidan-n-matawch

Gano

Sango-n-kara

Toto

Hariri

Doma

Lafiya Berebere

Waze

Shebshi

Dogo ○

Parna

Damoy

Sabongari

Fagam ○

Shira ○

Ganjuwa

Zaranda

Dalhaji

Shaffero

Riruwe

Walgi

Kuroko

Tirrin

Yakoba ○

Kuji

Yunguru

Gasoi ○

Katsena

Kamuku

Kagoro

Kaura

Kachia

Kafanchan

Kagarko

Kwoi

Jaba

Kwotto

Kwassa

Kwassa Hills

Kwassa Mts.

Kwassa Mts.

Kwassa Mts.

with bush and trees, among which were the fleshy euphorbia, they made a steady ascent to Garu Gobaz. The rock formation here is still the stratified sandstone found in Nupe, with a very steep dip to north and north-east. On one of the ridges before coming to Gumna, there are several prominent peaks of semi-vitrified rocks, which consist chiefly of quartz. Gumna is built between two rocky hills, which rise from a well-cultivated plain. It is the chief town of this portion of Bassa, and contains 3000 mixed population, chiefly Bassa and Gbari, all of whom speak Haussa.

On leaving Gumna, it was necessary to have the loads carried outside the gates before being placed on the animals. Having crossed a low ridge of granite, they entered a rocky defile, with perpendicular faces 200 feet high, on which were native villages, whose inhabitants are an industrious race, cultivating the rich lands below.

Tegyina, which they next came to, contains 3000 people, chiefly Kamuko, with a few Bassa and Gbari. Although inferior in rank to Gumna, it is a town of greater importance. In the market, milk and butter were cheap and plenty, also vegetables; but guinea-worm is very prevalent among the people, from the water being drawn from stagnant pools in the town.

21*st April.* Under an escort of one horseman and one foot soldier, they set out, and, after riding 8 miles, came to a detached rock, named Ungwoi Karami, which rises 500 feet above the plain. Here is a barrier of thorns, at which toll is demanded of all caravans at the rate of 5 cowries each man, which in a large party comes to a considerable amount; and a like impost is taken at two other barriers in front. Being the King's guest, this toll was not demanded, but a present given instead. After passing the second of these barriers, the rocks retire on the west, leaving an open valley, and a huge rock standing in front, at a small village, on whose slope the party remained. While huts were being prepared they sat under the shade of a large baobab-tree; behind was a perpendicular face of rock; near it a group of women were engaged rubbing down grain into meal under the shade of a euphorbia which grew from the crevices of the granite rock. The green valley in front, dotted with trees, pools of water, and herds of cattle, seemed like an English park.

The chief's daughter, a lady of mature age, brought water to drink; she was dressed with only a few leaves hung in front from a cord round the waist. The men had a leather apron behind. Yet this independent, rude people are kind and intelligent.

On the 22nd April they left Ungwoi and entered Kamuko, reaching Wasaba in the afternoon. This is a walled town,

built at the foot of a conical hill of granite, whose north and eastern slopes are precipitous. From half-way up Dr. Baikie obtained a general view over the country, but was prevented from ascending, as the summit is held sacred by the natives. Inside the town walls there are borassus, hyphaene, and date-palms. By the river-sides in the surrounding country the raphia and wild date-palms are abundant.

23rd April. The path was through dense jungle with open glades, in which herds of cattle were grazing. The shea butter-tree here attains an unusal size, and ripens its fruit in June. The people were now busy collecting the fruit of the locust-tree. On the 24th April a change was noticed in the vegetation, which now differed from that of Nupe.

On passing Gidan Magaja they left Kamuko, and entered again among the Gbari, sleeping in the town of Koriga, beautifully situated in a valley. Many smelting-furnaces had been seen, and iron-ore is here abundant in the metamorphic rocks.

On the 26th April they crossed level ground of a stiff clay, with ravines 50 feet deep, cut by the floods; the sides of these consisted of beds of clay and gravel. In the bottom of stream-beds the rocks were commonly of metamorphic schist, but the plains where the clay has been washed away showed granite, either flat or protruded above the general level. As yet the rains had scarcely influenced the rivers, and where now only a few inches of water were found, in the month of September there would be two or three fathoms, and canoes required to cross with.

At Ruku, or Riyuka, where they slept on the 27th, the papaw-tree was seen in cultivation; 28th April they had entered the country of Zariya, and crossed a dense forest full of wild animals, on the banks of the Karsi. The deleb palm (*Borassus flabelliformis*) forms a marked feature of the landscape, with its tall cylindrical swollen stems.

On the 30th April they were before Zariya, one of the great centres of commerce in Haussa, frequented by merchants from Bornu, Adamawa, and Nupe. The silk-cotton trees which surround the town distinguish it in the plain; of these there are upwards of 1000, varying from 50 to 70 feet high. When close to the city a small stream is crossed, and the ground rises to the walls, which are 10 miles in circumference, and from 16 to 18 feet high, pierced by eight gates, the ninth having been closed after the entrance by it of Mallam Musa.

At a former time the space included by the wall was much greater than at present, and included the Kufena hills, to the north-west, 700 feet high, and from which the only general view of the city is to be had. Zariya is built on a plain of tertiary

clay, lying on granite, which is here and there protruded. The height of this plain above the sea is 2000 feet, and rivers drain to the Kaduna, and so to the Kworra. Inside the gate there are scattered groups of conical thatched huts, with gardens and fields between, wherein are plantains, papaws, date-palms, and vegetables, with pasture for cattle. The king was now absent, engaged in war with those to the south. While messengers went to inform him of Dr. Baikie's arrival, an opportunity was offered of examining the towns, and gaining information regarding its history and commerce. The slave-market has of late years diminished, and not more than 300 daily were usually to be found in it at the time of Dr. Baikie's visit, whereas three years previously as many as 4000 might have been seen; the price is one-third less than at Bida, on the Niger. Here Dr. Baikie purchased a young woman for 90,000 cowries, to save her from being sent to the open market. On one occasion, when there were only 90 slaves in market, Dr. Baikie estimated the attendance from 3000 to 4000. Besides slaves, there are horses, cattle, dates, pomegranates, figs, and wild fruits, with wheat, millet, cocos, cassada, onions, milk, and butter to be obtained. Turkey cocks are sold from 700 to 1000 cowries, and a young horse was purchased for 30,000 cowries. Theft in market is punished by a loss of hands and feet, and the fifth is a capital crime. There is no market-tax, but all animals are charged on leaving the city; a tax of 450 cowries is levied on each indigo-pit. An old man, with whom Dr. Baikie conversed, had known Dr. Vogel, and remembered his visit to Zariya, which was in the time of Abdu Salami: he was much liked, but spoke little Arabic or Haussa; he remained over a month. Another had been companion to Dr. Barth from Timbuktu to Kúka, and had seen Vogel in Bornu; and an old man recollected Clapperton's visit in the time of Abdul Kerim. The mosque of Zariya is a large building, 120 feet long, with two domes and a square tower at the north-east, ascended by steps. On the 20th May word came from the king asking Dr. Baikie to visit his war camp, which was to the south, near the Kaduna. The invitation was accompanied by a present of a slave boy. On the 26th May Dr. Baikie set out again, accompanied by Ibrahim. Outside the wall they passed herds of cattle, and many fields of corn, coco, and ground-nuts. At sunset they passed a beautiful village, in a clump of locust-trees, but rode on and slept at a few huts, which they reached by starlight; here they found bad accommodation, and went to bed after supping on meal and cold water.

On 27th May they came to Egabbi, 16½ miles from Zariya, by the road, having crossed on the way several streams flowing south-east. Here Ibrahim set off on some private business,

leaving Dr. Baikie to exercise patience until his return, which was not before the 2nd June; then still following a southerly course, and crossing a stream 100 yards wide, with banks 15 feet deep, which in the rainy season would be filled, although now it had but 18 inches water, they came to Rubbu, distant from the Kaduna three-quarters of a mile. The stream is here half a mile wide and 5 feet deep. Here the aneroid barometer was injured by a fall. Being now in country devastated by war and near the army, it became impossible to obtain food, and for several days Dr. Baikie had not enjoyed one full meal.

Turning westward they recrossed the Kaduna at one of its windings, where it was only 4 feet deep, and again on the 11th of June, where it was 200 yards wide and 5 feet deep, flowing among schist rocks.

At the war camp Dr. Baikie was well received by the king, but found it difficult to procure even the commonest food, which the king did not think it his duty to send to a visitor; at the same time he deferred payment of a debt of 450,000 cowries due for ten doubloons, until arrival in Zariya, but a slave girl was sent to reckon as 100,000, and a present of a slave to Dr. Baikie and his servant, in consideration of the presents given. The huts here were mere temporary shelters, ill calculated to resist the force of the tropical rains which now fell, so that the ground inside became a muddy puddle, on which branches were placed to keep the goods dry.

On the 15th June, the king moved his camp to the Kaduna: all was confusion; about 3000 horses, men, women, and beasts of burden pushing forward, worked the wet ground into a quagmire. The king went past with a guard of 50 horsemen and foot soldiers in front and in the rear, and selected a spot near the river, where rough huts were formed of branches, but it was evening before the first meal of the day was cooked. Here magnetic variation was found to be between 14° and 16° west.

18*th June.* Taking leave of the camp, Dr. Baikie followed a north-easterly course, and reached Zariya on the following day; passing the town of Zango, and a rocky defile with blocks of granite placed one on another, like a Cyclopean wall, surmounted by huge boulders. Dr. Baikie's servant, who had been left behind at the beginning to bring up the heavy goods, had arrived, and some time was occupied in re-arranging the loads. On the 26th June, they all left Zariya on the road to Kano, sleeping at Likoro, a walled town with 1000 inhabitants.

27*th June,* they crossed several streams which flowed to south-east and joined the Kaduna, and reached Guyimi. The country between Zariya and Guyimi is nearly level, with wet meadows and bare granite rock.

On the 29th, having left the town of Antsan they found the

streams flowing in an opposite direction, to pass round Bebeji and join one of the affluents of Lake Chad; they were now, therefore, in the central basin of the Sudan. Fever, which during the first part of the journey had spared Dr. Baikie, now came on, from the severe exposure and bad food. No mention is made in any of the notes of the daily use of quinine, and as in his general instructions for the preservation of health it is equally ignored, we may conclude that subsequent experience had not convinced him of its value as a prophylactic. It has also failed in other parts. Faki is the border town of Zariya, having been given up by one of the rulers of Kano.

30th June. The banks of streams in this region are of reddish clay, with sand and mud, resting on crystalline rocks. Bebeji is a large town with double walls, outside of which are fields of corn, cassada, ground-nuts, and indigo. It had been visited by Dr. Vogel, who fixed its latitude with accuracy, but was prevented from going on to Kano, where cholera was then raging. But from a rock outside the town Dr. Baikie obtained good compass bearings, which include the rock standing within the walls of that place. In Bebeji there are dates, limes, and lemons.

1st July. A mile from town they crossed the River Kunza, and reached Kaffi.

2nd July. The River Mallam was passed, with now only 2 feet of water in its sandy bed. A mile from town they were met by messengers, who escorted them into Kano, where they were well received by Sarin Saru, brother of the king, who was absent at a war camp in the south-eastern provinces of his dominion, whither it was at once agreed that Dr. Baikie should proceed.

On 5th July Dr. Baikie left Kano in light marching order. Outside the gate they passed Nasserawa, one of the suburbs, and followed a south and easterly course, over level land with whitish clay. Several walled towns were passed and streams crossed, which had already been seen when coming to Kano. At Sokwa Dr. Baikie found a man, whose father had been slave to the King of Fezzan, who had known Richardson, Barth, and Overweg, and told him of the fate of the papers of Dr. Vogel after the murder of Corporal Maguire.

6th July. The River Mallam was passed on rafts of calabashes, named "gaddo," which take three persons each time; the path then lay near the town of Girko between two granite hills.

7th July. After crossing the River Kunza and a granite rock named Hungu, 150 feet high, they reached Takai; but Dr. Baikie had a severe ague which forced him to dismount and rest for a time.

8th July. The king sent an escort to bring Dr. Baikie to Sangaia, where he received him with much attention. In the

town there is a mass of quadrilateral blocks of granite piled on each other, like those seen to the south of Zariya; this peculiar form is due to the wearing of the granite in certain directions, which produces perched blocks, not unlike those similarly placed by icework in other countries.

9th July. Dr. Baikie followed the king and army to Dutsi, a town placed in an amphitheatre of hills. Here the king had a grand review of his army, and afterwards told Dr. Baikie that at Kano all papers should be given over to him; but it now appeared that the greater part still remained at Zinder, whither they had been taken by the Azhenawa after the murder of Corporal Maguire.

14th July. Dr. Baikie left Dutsi, following a more easterly route than that he had come by, and supplying materials to fill in the map of a region unvisited by Dr. Barth.

If Dr. Baikie kept notes during his residence in Kano, they are not to be found among his papers. Most likely, when dwelling in a house, he wrote them out at once in full, and sent them off with other diaries. From the rough copies of despatches written in Kano and forwarded to Tripoli, we learn that the papers he was in search of proved to be of no value: they consisted of two books on astronomy, in German, bearing the names of Vogel and Overweg; two Arabic psalm-books had also been brought to Kano, but were not forthcoming. After the murder of Corporal Maguire, it seems that the plunder, including manuscripts, a musket, and five-barrelled pistol, was taken to Zinder by the Azhenawa, where they still remain, and may be had for the trouble of going to get them; but after the long distance already travelled, Dr. Baikie's supplies were exhausted, and he found himself compelled to return without having accomplished what he chiefly wished. While in Kano he suffered from fever, induced by his previous exposure and the filthy state of the city, which contains several lagoons of stagnant water, receptacles of filth exhaling malaria.

On the 14th August Dr. Baikie took leave of the king, and commenced his return to Nupe, following at first the same route he had come by, and afterwards a route more to the west. It was now the height of the rainy season, and streams which he had crossed without difficulty had become torrents filling their banks, and to be crossed only on rafts or in canoes. In the fields were heavy crops of corn, more luxuriant than those of the valley of the Niger, and the grass plains were more or less inundated. Around Bebeji there were green fields of young wheat and rice. There, a mixture of cotton-seed and bran is given to oxen, and is considered the most fattening food; horses and asses are fed on millet.

In Zariya, where Dr. Baikie arrived on the 20th August, it was necessary to dry all the loads, which constant rain had thoroughly wetted. The king was still absent in Zhaba.

On the 1st September they again set out, but were delayed at each of the small streams; and at Riyuka the huts were flooded and almost uninhabitable.

On 10th September, turning to the west of the old path and following a mountain stream, they came to Birun Guari, formerly visited by Clapperton. It is one of the oldest cities of this region, and is well placed in a valley surrounded by hills, with the Kurita River passing to join that from Womba, which meets the Kaduna near Akiri. The king of this place has a very bad name, in consequence of many travellers having disappeared mysteriously while under his protection. At Zhan Ruwa, which they reached on the 16th September, an epidemic had killed many cattle. With loss of appetite the animals sickened, and died in three days.

On the 25th September they again entered Gumna, but the king was waging war with those in front, and after a long delay Dr. Baikie was obliged to return to Tegyina and follow a western route across the Mariga River, which comes from Womba and Birun Guari; reaching Rabba on the 6th November, having found his old friend King Masaba in camp, and enjoyed his hospitality for several days. The Rabba daily fevers prevented Dr. Baikie from attending to business, and it was not before the 22nd December he was able to set out in canoes for his station at the confluence of the Niger and Binue.

II.

ESTIMATED COURSE and DISTANCE of JOURNEY between the NIGER and KANO in HAUSSA, 1862; with BAROMETRIC ELEVATIONS of the PRINCIPAL PLACES, including the WATER-PARTING between the NIGER and LAKE CHAD.

Barometric Observations.

Hour.	Air.	Barometer Aneroid.	Place.	Hour.	Air.	Barometer Aneroid.	Place.
	°	In.			°	In.	
		29·35 min.	Bida, 16 miles N. of	3 P.M.	94	28·53	Wasiba.
		29·40 max.	the Kworra, 12 E.	7·30 A.M.	81	28·2	Gidan Magaja.
			of the Kaduna.	5 A.M.	80	27·7	Karu.
6 A.M.	82	29·30	Lemu.	2 P.M.	99	27·60	Koriga.
4 P.M.	95	29·25		4 P.M.	94	27·4	Karkaso.
1 P.M.	85	29·45	Siji.	5 P.M.	89	27·42	Karsi.
Noon.	100	29·55	Bed of River Kaduna.	4 P.M.	90	27·35	Rafin-yasi.
				4 P.M.	83	27·33	Zariya.
9 A.M.	83	29·15	Gumna.	9 A.M.	83	27·44	
5 P.M.	90	29·2					

ROUTE from BIDA to KANO.

Distance.	Course (Compass bearings).	Place.
Miles.		
		Bida, 6 miles in circumference.
7	N.N.E.	Kpakpagi, pop. 1000.
2½	N.N.E.	Mankade, pop. 300.
1½	N.N.E.	Kpada, pop. 300.
2½	N.N.E.	Masalatsi, pop. 1200.
5½	N.N.E.	Lemu, pop. 500.
3	N.E. / N. by E.	Dasagi, pop. 60.
2	N.N.E.	Kabba, pop. 60.
4	N.E. by N.	Tsiji, pop. 600.
6	N.N.E.	Gbogi, pop. 800.
½	..	Bed of Kaduna, sandy, no rocks.
1½	N.N.E.	Wutere.
4	N.E. by N.	Kutmuku or Gurmi.
6½	N.E.	Garu-gobaz.
		Three ridges, running N.N.E.; a kind of shale almost crystalline, probably of the sandstone of Nupe; dip considerable.
4½	N.E.	Gumna, pop. 3000,
6½	N. and N.E.	Tegyina, pop. 3500.
9½	..	Ungwoi-bawa.
9	..	Wasaba, pop. 2500.
12	N.E. and N.E. ½ E.	Kwangoma, pop. 3000.
4½	N.E.	Zhan-ruwa, 1200.
1	N.E.	Gidan-magaja.
11½	N.E.	Karu.
10	N.E.	Koriga.
11	N.E.	Riyuka.
14½	E. ½ S.	River Karsi.
1½	E.	Karsi.
12½	E.	Rafin-yasi.
8	E.	Zariya.
9	N. 30° / N.E. ½ E.	Likoro.
14	N.E. ½ E.	Guyimi.
6	N.E.	Antsan.
9½	N.E.	Fa-ki.
12½	N.E. ½ E.	Bebeji.
1	N.E.	River Kunza.
6	N.E.	Madobi.
3	N.E.	Goza.
4½	N.E.	Kaffi.
3	N.E.	River Mallam.
6½	N.E.	Kano.

ROUTE from KANO to the SOUTH-EAST and DUTSI.

Distance.	Course (Compass bearings).	Place.
Miles.		KANO.
8	S. 26° E.	Dawaki, 2 ditches, 4 gates, 1600 or 2000 inhabitants.
3	S. 27° E.	Sokwa, 2000 inhabitants.
2½	S. 30° E.	River Mallam, ⅓ mile wide, 5 feet deep in July.
4½	S. 40° E.	River Armetti, 50 yards wide, flows N. to River Mallam.
2½	S. 35° E.	Girko, walled, 2 ditches, 3000 or 4000 inhabitants.
2	S. 40° E.	Dan Malaki, 150 or 200 inhabitants.
2½	..	River Dunduru (or Kunza), 60 or 70 yards wide, flows E. by N., comes from Kanawa and Bebeji.
1½	..	Small river flowing N. to River Kunza, 15 yards wide.
3	..	Small river from Dal, N. to Kunza, 60 yards wide.
..	..	Dan Serina, a walled town, 2 ditches, 1000 inhabitants.
5	..	Village and rock of Hungu.
2½	S.E.	River Dunduru Gaiya, small but deep stream.
4½	S.E.	Takai, walled, double ditch, 1500 inhabitants.
8	E.	Sangaiya, walled, double ditch, 1500 inhabitants.
12	N.E. by E.	Dutsi, wall and stockade, several miles circumference, 2500 inhabitants.
9½	N.W.	Katsa, 2 ditches, stockade.
7	W.N.W.	River Dunduru Gaiya, 5½ feet deep, 20 yards wide, flows N.
3	..	Gaiya, walled town, 2 ditches, 4000 inhabitants.
4½	W.N.W. ½ W.	Lajawa.
5	..	River Mallam, ⅔ mile wide, 7 feet deep, N. 10° E.
..	W.N.W. ½ W.	Gogyam, stockade, 1500 inhabitants.
5	..	Village and rock of Tanagar.
14	..	KANO.

RETURN JOURNEY from KANO to RABBA.

(In returning, Dr. Baikie altered his course to pass by Birun Guari and to reach Rabba instead of Bida, whence he started.)

Distance.	Course (Compass bearings).	Place.	Distance.	Course (Compass bearings).	Place.
Miles.		Riyuka.	Miles.		
2	?	Stream.	1½	W.?	Sumo.
14	N. 35° W.	Tsofu.	..	N.N.W.	Gbobi.
6	N. 60° W.	Fa.	9	W. by N.	Gberi.
?	?	Birun Guari.	2½	S.W.	Stream.
12	S.S.W.	Kirazu.	2	..	Stream.
10	S.S.W.	Kwoga.	2½	S.S.W.	Raganda.
6	S.S.W.	Stream.	8?	W.	Stagnant water.
5	S.W. by S.	Stream.		..	Stream.
3½	?	Gidan Magaja.		S.S.W.	Wutsisa.
1	S. ½ W.	Zhan-ruwa.	7½	W. by S.	Kabozhi.
5	S.W.	Kwangoma.	9½	W. by S.	Udogo.
10	S.W.	Wasaba.	8½	W. by N.	Camp of Masaba.
12	S.W.	Ungwoi Bawa.	6½	S. 10° W.	Likoro.
?	S.W. by S.	Ungwoi Karami.	6½	S.W.	Kpaseta.
?	S. 10° W.	Kumuni.	1½	?	Fanga.
?	S. 70° W.	Tegyina.	14½	S. by E.	Ibi or Egbe.
9½	W. by N.	River Mariga (from Womba.	10	S.	Zuguna.
4½	N. ½ W.	Lalli.	11½	S.	Mokwa.
			6	S.	RABBA.

Some of these bearings are true, not compass; the fever then on Dr. Baikie has confused his notes.

III.

ENUMERATION OF KINGS OF THE FOLLOWING STATES OF HAUSSA AND NUPE.

(From the Notes of Dr. W. B. Baikie, R.N., collected in 1862.)

1. Kano.
2. Zariya.
3. Zamfara.
4. Katsina.
5. Gobir.
6. Azben.
7. Ader.
8. Daura.
9. Nupe.

1.—*The Kings of Kano in Haussa.*

(From Notes collected at Zariya, May 25, 1862.)

	Yrs.	mhs.	dys.
1. Bakuda	70	0	0
2. Kanus	30	0	0
3. Alkaji	2	0	0
4. Gaogau	50	0	0
5. Makarkari	2	7	0
6. Kaowana	1	0	0
7. Senaida	30	0	0
8. Ramagaka	7	0	0
9. Taratori	7	0	0
10. Bangazhi	50	0	0
11. Jenaji	0	0	12
12. Yazhi	10	0	0
13. Umar	0	0	10
14. Nuto	0	0	10
15. Goto	50	0	0
16. Danda	70	0	0
17. Abdalahi	15	0	0
18. Yakubu	10	0	0
19. Nushama Riufa ..	37	0	0
20. Abdalahi	11	0	0
21. Mohamma	50	0	0
22. Yakahi	0	5	0
23. Abubakr Kadda ..	7	0	0
24. Mohamma Sabasara	1	0	0
25. Mohamma Zaki ..	37	0	0
26. Mohamma Abdallahi	4	5	0
27. Mohamma Katamdi	20	0	0
28. Alhaji	1	0	0
29. Sekaro	0	7	0
30. Kakana	8	0	0
31. Suyaka	0	1	0
32. Yawa	10	0	0
33. Dadi	33	0	0
34. Saraku	19	0	0
35. Mohamma Kamfara	13	0	0
36. Taukari	9	9	0
37. Yazhi	12	0	0
38. Baba Zaki	78	0	0
39. Dauda	4	0	0
40. Alwalli	27	0	0
41. Sulimana	12	0	0
42. Dabu	27	0	0
43. Usman	10	0	0
44. Abdu	7	0	0

The last four are Fulani Kings, of whom the last is now on the throne. Sulimana was a Fulo from Bornu; Dabu a Basibebe of Kano; Usman son of Dabu, and Abdu, brother of Usman.

2.—*Kings of Zariya in Haussa.*

(From Notes collected at Zariya, May 26, 1862.)

1. Gunguma.
2. Mataze.
3. Tumza.
4. Tumusa.
5. Sulimano.
6. Nassau.
7. Damazaki.
8. Neigwago.
9. Kusa.
10. Nawinako.
11. Masikar.
12. Kiyau.
13. Bariyakar.
14. Nazhidadi.
15. Kirari.
16. Zhizhinka.
17. Sukana.

(The above seventeen were heathens.)

	Yrs.	mhs.	dys.
18. Rabbawawa	25	0	0
19. Gudaumaska ..	2	0	0
20. Nawakarri	3	0	0
21. Kimas	1	0	0
22. Bakaturunku ..	30	0	0
23. Ibrahima	27	0	0
24. Karma	10	0	0
25. Kafau	2	0	0
26. Bako	13	0	0

	Yrs.	mhs.	dys.
27. Aliyu	6	0	0
28. Suyaali	11	0	0
29. Musa	0	6	0
30. Gabi	3	6	0
31. Waude	0	0	1
32. Abdukuda	9	0	0
33. Brahima	3	0	0
34. Aliyu	27	0	0
35. Mohamma Rabbawawa	0	6	0
36. Ibrahimo Yasku ..	13	0	0
37. Bako	3	0	0
38. Sukana	1	0	0
39. Aliyo	7	0	0
40. Ibrahima	3	6	0
41. Muhammado ..	17	9	0
42. Suya-ali	9	8	0
43. Bako da Moya ..	6	5	0
44. Isabaka	2	0	0
45. Ibrahima a sa Kuka	1	4	0
46. Bako dan Sekwana	10	0	0
47. Mohamma dan Gunguma	11	2	0

	Yrs.	mhs.	dys.
48. Rabbon bawa ..	7	0	0
49. Mohamman Gabi ..	1	1	0
50. Inusa	5	5	0
51. Bako babban Muturu	50	6	0
52. Aliyu	1	0	0
53. Mohammadu Maigamo	2	8	0
54. Isabaku	20	3	0
55. Mokkam	2	1	0

FILANI KINGS.

56. Mallam Musa ..	12	10	0
57. Yan Musa	14	10	0
58. Abdul Kerim ..	11	5	0
59. Hammada	0	0	53
60. Mohamman Sani ..	77	3	4
61. Sidi	0	10	0
62. Abdu Salami	1	7	0
63. Abdu, 6 years; now reigning in 1862.			

Pulo Kings of Zariya.

1. Mallam Musa, Malle.
2. Yan Musa, Ba Filatsin Bornu.
3. Abdal Kerim, Ba Filatsin Katsina.
4. Hammada, son of Yan Musa.
5. Mohammad Sani, son of Yan Musa.
6. Sidi, son of Mallam Musa.
7. Abdu Salami, Ba Filatsin Zariya.
8. Abdu, son of Hammada.

Mallam Musa, who subdued Zariya, came first as a poor Mallam, and Yan Musa was a petty trader wearing a "banti." When Mallam Musa became king, he made Yan Musa his head "Maidawaki." Sidi was dethroned for cruelty by Sultan Aliyo, and died or was killed in Sokoto. Mohammed Sani was very popular. Abdu Salami was killed in battle; his father's name was Mallam Maikai, born in Egabbi. Abdu is a very quiet, reserved man, about 44 years old, and is on the whole well liked. He does not speak much Fulo; he has numerous offspring, and his eldest son is his "Maidawaki."

3.—*Kings of Zamfara.*

1. Mallu.
2. Yakubu.
3. Marake.
4. Aberisi.
5. Dan Bako.
6. Na Godi.
7. Dan Gaddo.
8. Dan Bawa.
9. Adam.

PULO KINGS.

10. Mohamnian Zhemu.
11. Tabari.
12. Mohammadu.
13. Mohamma.
14. Isahaku.

4.—*Kings of Katsina.*

1. Alumba Rakka.
2. Aligu.
3. Sanwan.
4. Almuzana.
5. Al Bakari.
6. Mohamman Gama.
7. Gaude.
8. Kadri.
9. Tofo.

10. Meketamma.
11. Aatu.
12. Hamidu.
13. Khalidu.
14. Yakuba.
15. Mallam.
16. Sarikin Magazhi.
17. Koran.
18. Toagarana.
19. Agoreggi.
20. Gozo.
21. Magazhin Khalidu.
22. Dan Kasawa.
23. Randa.
24. Umari.
25. Binoni.
26. Amafedi.
27. Dan Gbaura.
28. Dan Bekkori.

PULO KINGS.

29. Umaru.
30. Sadiku.
31. Mohamman Bello.

5.—*Kings of Gobir.*

1. Maubu.
2. Sukate.
3. Tina.
4. Zhuki.
5. Wadobe.
6. Yeudi.
7. Gawo.
8. Biguga.
9. Gazhire.
10. Wurfakka.
11. Dangana.
12. Zhivan.
13. Magazhin Gadi.
14. Batsiri.
15. Soba.
16. Babari.
17. Bawa.
18. Yakuba.
19. Bunu.
20. Yumfa.
21. Sulufu.
22. Gwomki.
23. Ali.
24. Zhibbo.
25. Batsiri.
26. Mayidjaki.
27. Bawa dan Gwomki

6.—*Kings of Azben.*

1. Mazanázhi.
2. Tumbar.
3. Dan Sakko.
4. Yutumbar.
5. Yerimas.
6. Mohamma Kuluwal.
7. Atturus.
8. Loso.
9. Ibrahim.
10. Annur.
11. Emakke.
12. Ezaganwel.
13. Iserifan.
14. Kil mual.
15. Kil nugal.
16. Maganwil.
17. Mohammed Weilaz.
18. Iluikul.
19. Ahamman.
20. Ilazhil.
21. Mikal.
22. Mikitu.
23. Kiltanwul.
24. Girmus.
25. Ibrahima Khalilu.
26. Ibrahima Segir.
27. Ahammadu bukai.
28. Wandandi.
29. Alwassal.
30. Kilageris.
31. Hawade.
32. Huma.
33. Zuwar.
34. Thiragan.
35. Izalc.
36. Ilias.
37. Alumu.
38. Yunsikil.
39. Azure.
40. Azgan.
41. Amale.
42. Alagam.
43. Igidallam.
44. Ifgas.
45. Ikkidammat.
46. Hogazam.
47. Awagatam Zadeir.
48. Awakis.
49. Eminsi.
50. Yuhabd el Kadir.
51. Mohamma Amizhi.
52. Mohamma Guma.
53. Mohamma Tagamas.
54. Ibra.
55. Abubakr.
56. Inagaras.
57. Aruf.
58. Al Harsan.
59. Sikita.
60. Mohamma Magaaruk.

7.—*Kings of Ader.*

1. Budal.
2. Gumau.
3. Guma.
4. Gumbun bakr.
5. Astu.
6. Kaderi.
7. Musil.
8. Tenabir.
9. Aminkiu.
10. Amankai.
11. Arasio.
12. Mohamman Nida.
13. Giskas.
14. Amarazal.
15. Ibrilu.
16. Tumurki.
17. Alwali.
18. Weilaz.
19. Zukkar.
20. Waminzar.
21. Wellimwada.
22. Wellimwaza.
23. Mohamman Tumburki.
24. Mohamman dan al Wali.
25. Nitahar.

8.—*Kings of Daura.*

1. Daurama.
2. Karabgari.
3. Bawo.
4. Zhada.
5. Banan alla.
6. Kariya wiya.
7. Womasu.
8. Atsiku.
9. Sanuku.
10. Waama.
11. Runo.
12. Waasu,
13. Sabtan.
14. Sanda.
15. Abdu.
16. Wagashi.
17. Halasu.
18. Sanutu.
19. Azbefas.
20. Wobasi.
21. Arahin.
22. Saangutu.
23. Mazozhi.
24. Womasu.
25. Tassa.
26. Sattaku.
27. Tudunkwinzhi.
28. Womasi.
29. Sunaa.
30. Wazhi.
31. Wohami.
32. Hazo.
33. Wogasi.
34. Sattaina.
35. Hauza.
36. Wosalla.
37. Trofo (driven away by Fulani).
38. Serikin guari.
39. Lukudi.
40. Kyenkyere.
41. Nuhu.
42. Isihaku.
43. Mohamma.
44. Zabeiru.
45. Mohamman Bello.

The present King of Daura belongs to the tribe of Yerimawa. He is now old; is short, with large head; says little, and has a peculiar kind of snort. He has upwards of 30 children.

9.—*Kings of Nupe.*

Etsu Tsado,
„ Zini,
„ Zibi,
„ Dala,
} Reigned at Nupeko.

1. Estu Jia, king about 1760-85. A great warrior, and a popular king, whose reign is said to have been the most flourishing in Nupe. He built Gbara, and removed thither from Nupeko; he built Leno. All Nupe, from Ebe to Dibo and Kupa, was directly under him. When he captured people he made them settle and build towns, and many of these towns still exist and flourish. He drove his relative Mazu to Yauri. He was a Mohammedan.

2. Etsu Samaza was driven by Mazu from Nupe, and fled to Ibgira. He died in Koton Karafe: his descendants still live in Igbira; one of his sons, an old man, being now in Ajara.

3. Etsu Mazu seized the throne: he was a relative of Etsu Jia by the female side.

4. Kolo Nagari, son of Etsu Mazu; he took his mother's advice so constantly that the Nupe people said they would not be governed by a woman, and, rising against him, drove him to Yauri. He and his father's family were settled about Djugoma, and when he was driven from the throne this district adhered to him, and has ever since been separate from Nupe, being known as Egwa-djagwa or Djagwa-djugwa, the chief town being Tsuafo. On his death he was succeeded by Mamudu, who first invited the Fulani to Nupe, who on their arrival found

Mamudu dead. He was succeeded by his brother Mazu; he by his relative Majia (Mama Jia), of whom more afterwards.

5. Aliaza, more commonly known as Yikenko, from a saying of his that "his teeth were now out and would not again go back." He was a heathen, although all his family were Mosleman, his maternal grandfather having been N'dazo, or priest of Gemoko, a brave and open-handed, but often cruel, man; he became king about 1790. He first began the practice of selling as slaves captives taken in war. Being engaged in war on Egwa-djugwa, he lived long at Soroge or Sologe, in Gbedagi; he was driven to Busa, but returned and regained his throne. He died at Vundugi, in Kusopa, near Daba-guze.

6. Zimada Kolo, grandson of Etsu Jia, was born in Zima, near Gbara; a tall, fine man, marked with "bikun;" considered a just, good king. He lived long at Wabogi, then moved to Lagbata, where he was driven by war; then to Ragata, where he was killed about 1810 by Majia and Mallam Dedo. In his time Majia and the Fulani first made combined war, and the latter commenced to have a footing in Nupe.

7. Tderiza, or Idriza, son of Zimada. On death of his father he fled to Ilorin; after a time he crossed the Kworra, at Gbadjebo, and made war on the Fulani at Rabba, he having his camp at Jangi. Majia was called in, and bringing war behind Idriza, he was compelled to fly, and settled for a long time at Katsa, in Esitako, where he had a war camp. He died and was buried in Gbara. His full name was Idriza Gana. He was a tall, fine man, very dark, and marked with "bikuns." He was born in Wabagi in 1796.

Majia during all this time disputed the kingdom; he was of Etsu Mazu's branch of royal family, and his previous title had been "nokoji," which had been held by his father, grandfather, and great-grandfather. He called in and was supported by the Fulani, and he first introduced the dreadful civil war which nearly destroyed Nupe. He was for some time settled in Rabba, and after the death of Zimada the whole of Kusofa was given him by the Fulani. He was a stout man of yellowish complexion, and no mark; his mother was a Kupa woman, a slave, but good-looking. At first he was a cap-maker; he was born at Zima; died and was buried at Djuguma.

8. Etsu Isa, son of Idriza, now represents the legitimate branch of the Nupe royal family. At first he resided at Gbara, then at Labozhi, where he was attacked by Omaru, and where all the old Nupe insignia of royalty were burned. He now lives in Bida, having promised not to disturb the present order of things. Several towns about Lom have been given to him by Masaba: he is about 44 years of age.

In Tsuafo, Majia was succeeded by his son Etsu Isado, who was an active agent in taking and destroying Rabba, under Ottoman Zaki. He died in Borogi, and was succeeded by Maza, who was killed in Djuguma in Omaru's wars. The present King of Tsuafo is named Sabo, but commonly known as Babba; he is grandson of a former king named Sabu, a branch of Majia's family, and if he dies the throne will probably be filled by one of Majia's descendants, many of whose younger sons are yet alive.

Note.—Ebe pays Tsuafo, which unites with Masaba in paying to the Sultan of Gwando.

Masaba was driven from Rabba by Mazigi and Andi, about three years after Mallam Dedo's death, or about 1836.

Children of Mallam Dedo.

Name.	Eldest Son.	Mother.
1. Mazigi	Umaro	Fulo.
2. Abdallahi	Muhamma Gana ..	Nupe-Basa.
3. Usman Zaki. (Died 1859)	Maliki	Bornu.
4. Khabiba, aged, now (1864) about 60	No children	Kororofa.
5. Mustafa	Yusufu, or Tsado Dzuza	Fatima a Nupe.
6. Mahamet	Yisagi	
7. Mahamma Saba,* Lukpon, or Masaba, now aged 52; King of Nupe (1864)	Lukpon	
8. Ibrahima	Rasid or Tsado Ziko	Nupe.
9. Aminatu	.. ..	Akoko.

* The other names are Mahamma Saba, Maha Saba, Masaba, Etsu Saba, Nda Saba.

IV.

On the Rise of the Niger and its Eastern Tributaries; from the Notes of Dr. W. B. Baikie, R.N.

At the end of June, or in the first week of July, the Kworra begins to rise between Rabba and the Confluence; it has reached its highest level by the end of September. Early in October it begins to fall; throughout November it falls rapidly, but slackens towards the end of December, and by the 1st of January is nearly stationary. From the latter part of this month to the end of February there is a second rise of limited amount, which at Rabba varies with the season from 8 to 18 inches, and at the Confluence does not exceed 4 or 6 inches. Early in March it again falls, and steadily subsides until the end of June.

The Binue, Guarara, and Kaduna, or Lifun, have but one period of rise, which begins before that of the main stream, and reaches its height before the Kworra has begun to fall; this com-

mences early in April, and may possibly have caused the rise observed by Mr. Laird at Idda on the 22nd of March.

The Kworra, coming from the westward, and extending over many degrees of longitude, is differently acted on in various parts of its course.

From Yauri downwards the rains are brought by south-east and north-east winds, and to a more limited extent in September from the south-west.* In its middle part the rains have less influence, while towards its source the chief supply is brought by south-west winds in September, October, and November. The floods which these occasion, flowing through level countries at a slow rate, do not reach Timbuku before January, when they first retard the fall, and occasion a small rise, varying in amount at different points with the width of the river-bed.

At the Confluence there is a difference in the colour of the two waters; that of the Binue is of a deep transparent blue, called in Haussa "bakyin ruwa," or black water, while the Kworra, from its turbid muddy colour, is named "farin ruwa," or white water; this distinction is lost when both are in flood, and come down loaded with sediment.

V.

List of Native Vocabularies of small or before little known Tribes.

(Collected by Dr. W. B. Baikie, R.N.)

1. Yeskwa.
2. Yagba.
3. Ayo (near Daroro).
4. Zozantsi.
5. Hausra words from Zariya.
6. Towani (western districts).
7. Ninjom (Towani, N.E.).
8. Kattab.
9. Wura.
10. Basa.
11. Kamuku.
12. Gadde.
13. Kadara.
14. Bonu.
15. Gulengwe or Ugu.
16. Ungwoi.
17. Zhaba.

V. *A Visit to the North-East Province of Madagascar.* By the Rev. H. Maundrell. Communicated by the Right Rev. V. W. Ryan, D.D., Bishop of Mauritius.

Read, January 14, 1867.

The north-east province of Madagascar is called by Europeans *Vohimare*, but by the natives of the country Vohimarina (from *Vohitra*, village, and *marina*, level). This province is well watered by numerous streams, which, rising among the mountains of the interior, flow eastward into the Indian Ocean. The

* Between Bida and Zariya the rainy season ends on the 3rd of October.

province on the whole is mountainous, though possessing along the courses of its rivers large, rich, fertile valleys, which abound in uncultivated vegetation.

These valleys present every advantage to colonisation. They might, with a little enterprise and outlay, be easily irrigated by the streams which flow through their midst, and would thus become capable of producing almost any quantity of rice, sugar-cane, and all other tropical productions. In the woods, especially those in the country around the Bay of Diego Suarez, there is much hard timber that might be used either for shipping or building purposes, while from the mountains might be obtained abundance of *stone*, and, according to the statements of some, *iron*.* I have heard and read also that coal is found on the north-west coast, at a place called Passandava, near to the French island of Nossibé.

Quartz is found in great quantities. This province is remarkable for the facilities it offers to commerce, from the magnificent harbours it possesses; as if Providence had decreed that it should yet become a seat of enterprise, commerce, and civilisation.

The chief of these harbours on the east coast are the Bay of Vohimare, Port Leven, Port Luquez, and the Bay of Diego Suarez, or British Sound. Sir Robert Farquhar endeavoured to establish a colony at Port Luquez, and sent ships there for that purpose; but the settlers were murdered by the Sakalavas, who were then far more savage and less civilised than they are now. The bays of Vohimare and Diego Suarez deserve our chief notice, both on account of their natural advantages, and from the adjoining country to each being uninhabited, while the intervening country is not, except by wild bullocks and crocodiles, and a very few men, who spend their time in hunting the wild bullocks, and in taking the calves either to Amboanio or Antomboka, where they are tamed and placed with the other herds.

The Bay of Vohimare is a fine sheet of water, running inland in a westerly direction, and shut off from the Indian Ocean by a coral-reef which runs almost north and south. The entrance to it is at its south-east corner. This entrance is narrow, but of sufficient size and depth of water for any of our largest ships. If the wind is blowing from the south-east or east, there is no danger in entering; but with a strong south or south-west wind, so narrow is the passage, that in a few moments you may be on the reef.†

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* I have seen inferior iron, which shows that perhaps the good may yet be found.

† Of course, this applies only to sailing-vessels.

As you enter, the town of Ibarana appears on the left, while on the west and north-west the bay is enclosed by mountains, and round its border, between the water and the above-mentioned mountains, is a belt of trees and shrubs. Thus the water of the bay, this belt of wood, and the mountains beyond, make up a beautifully picturesque view.

It is the policy of the Hovas to build their citadel some miles inland from the coast, that they may not be bombarded by French and English men-of-war. This explains why so few Hovas reside at Ibarana. They look upon this small port as a trading-place simply, and are never there in large numbers, except when ships are in the harbour, when they come and remain there till the ships are gone away.

Ibarana scarcely contains more than a hundred houses, half of which are sometimes empty. It generally contains from 100 to 200 inhabitants. When a ship is there for bullocks, it presents a lively aspect. The Hovas and Sakalavas flock in from Amboanio and the surrounding country, so that Ibarana at that time may have a population even exceeding 1000. The following day, after the departure of the ships, Ibarana assumes its wonted quiet.

At the town of Amboanio, which is about one mile from the sea, eight miles south of Ibarana, and situated on a slight eminence commanding an extensive valley, watered by two streams, is the citadel. This is about an acre of land, in the form of a square, enclosed by a palisade of wood. There are a few cannon mounted at the corners of this citadel, and at its principal entrances. Within are the houses of the Governor, the officers, and soldiers, and the powder-magazine. To a European it is a place of insignificance, scarcely deserving of the name of citadel or fort or battery, though it is not too much to say that it is by means of such places built, and garrisoned by a mere handful of disciplined soldiers, in different parts of the country, the Hovas keep in subjection and fear the conquered tribes of Madagascar.

Besides this citadel or *rova* (fence, palisade), as the natives call it, the town of Amboanio comprises two other divisions: viz., the *tanána ny borizany*,* or *town* of the civilians, and the town of the Sakalavas (the natives call any collection of houses a town, so that there are many towns within a town). Hence, the citadel, the district of the civilians, and the district of the Sakalavas make up the town of Amboanio. This town contains from 500 to 1000 inhabitants. The population is very fluctuating, as very many of the people who have houses at Amboanio

* *Borizany* is the native corruption of "*Bourgeois.*"

have other houses in the country at their rice-grounds, and they are often away from Amboanio for months. Again, the Sakalavas, from their inveterate hatred of the Hovas and of their galling rule, prefer living in the country, and only come up to Amboanio at the annual feast, at the Sakalava feast of *Manangana Savatra* (the Feast of Circumcision), at similar great occasions, or to sell their rice. These houses in the country are severally called by the natives their *tanána;* but a general name for them all, and the country where they are built, is *Ambanivolo* (*Ambany*, "under," and *volo*, "bamboo"), because many bamboos grow near them. Another general name for all these small villages, and the whole country towards the interior, is Andoharano, *i. e.*, "The country about the sources of the streams," from *any*, "there," *loha*, "head," and *rano*, "water."

It is at Ambanivolo, or Andoharano, that the natives grow the principal part of their rice, sugar-cane, manioc, sweet potatoes, &c. All the houses of Amboanio, like nearly all in Madagascar, are made of wood.

The houses of the Hova officers are peculiar, inasmuch as the two gable rafters, at each end of the house, are made to cross and extend higher than the top of the roof. Those in the house of the Governor extend highest, and those in the houses of his officers, according to their rank, are either high or low. No one must make his gable rafters as high as those of his superiors.

The Betsimsarakas build their houses, generally speaking, a little above the ground, a practice which they probably learned from Europeans, who are compelled when living in Madagascar, especially when living on the coast, to protect themselves from malaria and damp.

They also keep their houses very clean and neat, much more so than the Hovas and Sakalavas. This, too, may be attributed to their intercourse with Europeans. The beautifully fair countenances and the partly European features of some of them, and the many foreign tombs at Vohimare and elsewhere, lead to the supposition that many Europeans (some say old pirates) settled on the east coast of Madagascar, married native women, and had children.

The country immediately around the town of Amboanio is flat, except that between Amboanio and the sea, which is hilly, or, what we should call in England, downs. These downs are very extensive all along the coast at Vohimare, and afford splendid feed for cattle. The bullocks of Vohimare are the best in Madagascar, and fetch a higher price at Mauritius than any others.

The beautiful valley between Amboanio and the mountains of

the interior, and stretching for several miles north and south, is watered by the two streams Manambery and Fanambana; the former about three miles to the north, and the latter about three miles to the south, of Amboanio. The soil is of a black rich nature in many parts.

At present it is covered chiefly with long grass; but, if irrigated with the waters of the above-mentioned rivers, it might be made to grow in abundance all the tropical productions necessary to make Ibarana, the port of Vohimare, a place of commerce; and then industry and civilisation would spread throughout the north of Madagascar.

The interior from Amboanio, as in all the north of Madagascar, is mountainous; though, running between the mountains, there are large, rich, fertile, and well-watered, but uncultivated, valleys.

Many of the mountains are wooded. The rafia palm is seen growing along the courses of the streams that wind their way among the mountains, while the travellers' tree is found right at their summit. I was ascending one of these mountains once, with two natives; the water we brought with us was finished long before we got to the top. I began to be very thirsty; the sun was very hot. My tongue was parched, and I could not partake of some food I had brought with me without water. To my great astonishment and delight, at the very top of this mountain, growing on the rocks, were a few travellers' trees; we pierced them, and out flowed the water. Such is a simple instance of the merciful provision of Providence for his people.

My object in ascending the mountain was to ascertain the nature of the country beyond.

The rufia palm also is of great value in Madagascar; the natives make the rafters and sides of their houses with its stems, and they thatch them with its leaves. Besides their houses, the Sakalavas make most of their *lambas* from the leaves of the rufia palm.

The character of the country between Vohimare and the Bay of Diego Suarez is pretty much the same as that of the country about Amboanio. It is mountainous towards the interior, and in many places right down to the sea-coast. There are also numerous and extensive valleys, well watered by numerous streams. Very little indeed, however, is known of this part of the island. As I passed through it on my way to Antomboka, I was struck with one peculiarity: all the plains and valleys are dotted over with palm-trees. The natives call this palm "*satrana*." It grows nearly to the height of the cocoa-nut tree, but often bigger in the stem, with the leaves very much like the leaves of the vakois. I should have thought it was

the vakois, but the natives knowing the vakois and calling this by the word "*satrana*," makes me think that this may be a palm peculiar to Madagascar. The following are the names of the places I stopped at during my journey.

Monday, Sept. 4th, 1865.—Started from Amboanio about 12 o'clock, crossed the river of Manambery, passed to the west of Ibarana and the Bay of Vohimare, and came, about 5 P.M., to Maintialaka, a very small village of not more than six houses. It is the last inhabited place I saw till I came to the suburbs of Antomboka.

Tuesday, 5th.—Left Maintialaka at 6 o'clock A.M., crossed the river of Maintialaka, which runs close by the village of the same name. No canoe: crossed, as also all the rivers afterwards, in my palanquin, borne by my bearers. At 11 A.M. arrived at the river of Manambato. This river is not wide nor deep. Breakfasted under a few sticks stuck in the ground and covered with rough grass. Started again after breakfast, and came in the evening to Sahampano. Water not good. My bearers made me a temporary hut for the night. There were lots of palm-trees in this place.

Wednesday, 6th.—Had very little sleep last night. The mosquitoes were both big and numerous: they greatly tormented me. I was told that the mosquitoes in the rainy season even kill the calves. I was at Sahampano at the most favourable time, and yet they kept me from getting sleep. After leaving Sahampano I travelled through a country thinly covered with the palm-tree. This palm is very much like the vakois. Breakfasted at Bemongo, in a beautifully shady spot. During the afternoon I came into a valley between two ranges of hills, and saw some wild bullocks; they either saw or smelled us, and made off towards the interior. At 5 P.M. crossed the river of Manakolana. The water was up to the chins of my bearers. Rested for the night at Andringianely. Found some small huts, which persons who preceded us had made. Good water. The palm-tree continued to become finer as I went north. At this place they gave a very pleasing aspect to the scenery.

Thursday, 7th.—Slept well the night previous; no mosquitoes troubled me. Started on our journey at sunrise. Soon after leaving Andringianely we came to the top of some rising ground, where an immense valley, full of the palm-tree, stretched far away towards the interior of the country and bound it in on the north by a high range of mountains running down to the sea-coast.

Port Luquez, which runs considerably inland, compelled us to turn our course to the north-west. We breakfasted at Andranosalampana. The water was fair. I found the sun very hot,

passing through this valley; my men got very tired. At evening I came to a river, and found that a part of my men had crossed it before I and my bearers came up; in the meanwhile the tide had come in, and we could not cross. My bearers cooked my rice, made me a hut, set fire to the shrubs and grass to drive away the mosquitos, and did everything in their power to make me comfortable. At midnight the tide gave out, and we crossed, without trouble, both this river and another; and at 5 o'clock the next morning I came up to the first party at Bedrakaka.

Friday, 8th.—After breakfasting at Bedrakaka we went north-east. Thus, by going north-west the day before and north-east on this day, we at length rounded the inlet of the sea called Port Luquez. Had a splendid view of this immense sheet of water as I travelled along up the mountain that I had seen far off in the north on Thursday morning. In the evening arrived at a place called Bemanevikia; it is close by the sea at the end of the range of mountains above mentioned. Good water and a cool sea-breeze made me enjoy this place.

Saturday, 9th.—Left the previous night's resting-place at 5·30 A.M., marched through a parched country and across an inlet of the sea, when the tide was out, till 12 o'clock. Crossed Rodo, the widest river all the way up. No canoe; much difficulty in passing. If my men had not been tall, I should not have got across dry. My bed was soaked, and my medicine-chest all but lost. The lad who was carrying it was being taken down the stream, when another person seized him and helped him through. Soon afterwards we came to the village of Rodo, which consists of four houses. Only two women were there. My rice had run out, and I sent men on forward to procure some.

Sunday, 10th.—Stopped at Rodo. The men who went for rice returned just soon enough to enable all to have a good supper on this day.

Monday, 11th.—Rose very early and left Rodo before 4 A.M., as we had a long journey before us. After travelling seven hours over hilly and irregular country, we arrived at a small village of about twenty houses, called Antananarivokely, or Little Antananarivo. It is situated in a plain a few hours' walk from Antomboka. From this place I sent word to the Governor that I would visit him on the morrow, according to the habit of the Malagasy people; for unless you acquaint the governor of a town of your visit, he justly looks upon your visit as an intrusion and insult.

Tuesday, 12th.—On this day I left Antananarivokely, and, after travelling across a plain, ascended the mountain on which Antomboka is built and entered the town.

Antomboka, properly speaking, is the name of a very small village of ten or twelve houses, situated close to the Bay of Diego Suarez; but the name is given by some natives and Europeans to the town or citadel of the Hovas, called sometimes by the Hovas Vohimarina, and by the Sakalavas Antsingy. It is a fortress of the Hovas, built on the top of a mountain, which on all sides is defended by projecting and precipitous rocks from invasion. There are only three ways by which the top is reached, all of them exceedingly difficult. One is on the south, one on the west, and one on the east. I first ascended by that on the south side of the mountain. Just before coming to the top the only means of getting up is a ladder of from 15 to 20 feet. Having mounted that, a plateau stretches itself out before you on which is built a Sakalava town, *i. e.* the Sakalava portion of Antomboka. Higher up is the town of the civilians, and higher still is the residence of the governor, officers, and soldiers.

This town is so naturally and almost invulnerably defended that it forms the key to the whole of the north of Madagascar. The Hovas quite look upon it in this light; so that while scarcely a hundred soldiers are stationed at Amboanio, quite a thousand are kept at Antomboka.

There are two small villages, near which are the ports for Antomboka, as Ibarana is the port for Amboanio. One is called Ambodivahibe, and situated at a small bay a few miles south of the Bay of Diego Suarez; it contains nearly a hundred inhabitants, and is the port for Arab dhows and about 8 miles from Antomboka. The other is the very small village of ten or twelve houses at the Bay of Diego Suarez.

This bay is beginning to be known by many as one of the finest in the world. It is completely protected from the waters of the Indian Ocean, and comprises five large harbours.

The scenery around is extremely beautiful; the soil is rich and the country healthy. To sum up all that is said in the preceding pages, the north of Madagascar is healthy, well watered, rich, and fertile, possessed of many materials on its soil for shipping and building purposes, and having great advantages for commerce in its fine and spacious harbours. This fine country, however, is but very thinly inhabited, and, of course, scarcely at all cultivated. The natives are quite satisfied in growing sufficient rice for their daily wants, and sufficient of sugarcanes for the manufacture of an intoxicating drink called "*toaka*;" but are not conscious of, and want the enterprise to work, the resources of their beautiful country. I may mention, in conclusion, that the Arabs from Nossibé, the Comoro Islands, and Zanzibar, are the principal traders in the north of Mada-

gascar. They trade chiefly in gum copal and other gums found in Madagascar, which they get from the natives in exchange for cotton-prints and *slaves*. For, notwithstanding the efforts of the British against the slave-trade, several slaves are brought to Vohimare under the pretence of being the sailors and servants of the owners of the Arab dhows, and then sold to the Hova officials. The influence of the Arabs upon the natives is anything but salutary.

One French gentleman, M. Guinet, lives near Amboanio, and is the agent for M. Lebrun, of Mauritius.

VI. — *On the Rivers San Gavan and Ayapata, in the Province of Carabaya, Peru.* By Professor ANTONIO RAIMONDI, Hon. Corresponding Member R.G.S.

Read, February 25, 1867.

THE want of agreement observed in all maps with respect to the rivers of the province of Carabaya, particularly those known in the country under the names of San Gavan and Ayapata, urged me to make an expedition into these deep Andéan valleys, so as to discover the real course of the rivers, from their sources in the Cordillera to their junction with the Inambari, to which nearly all the waters of the province of Carabaya are tributary.

Although the object of this memoir is to make known the course of these two rivers, namely, the San Gavan and Ayapata, which are the least known, I propose, for the better understanding of this portion of Carabaya, to make a few general observations on the province.

The province of Carabaya, so famous for its rich gold-mines, is in the southern part of the republic of Peru, and is in the department of Puno. It is bounded on the north and east by the republic of Bolivia; on the south by the provinces of Huancané, Azangaro, and Lampa, in the department of Puno; and on the west by the department of Cuzco.

A great and elevated chain of mountains, covered with snow, traverses the province from east to west, dividing it into two unequal portions. In the portion to the south of this great barrier there extends an elevated region, the lowest portion of which is more than 13,500 English feet* above the level of the sea. To the north of the same barrier are thrown out many ramifications or secondary chains, in which are found deep *quebradas* or narrow valleys, watered by as many rivers, which, uniting, form the great River Inambari.

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* All altitudes are given in English feet.

MAP
Showing the Course of the
RIVERS S. GAVAN & ESQUILAYA
in the Province of Carabaya
PERU
to accompany the Paper by
Sr. RAIMONDI

Reference.

- ◎ *Capital of Province.*
- ⊙ *Towns.*
- ○ *Villages.*
- □ *Deserted Tambos.*
- \+ *Points of elevation.*
- ~ *Route of the Author.*

The numbers indicate the altitude above the level of the Sea in English feet.

English Miles
5 10

70°30′ 20′ Lon. West from Greenwich 10′ 70°

Published for the Journal of the Royal Geographical Society by J. Murray, Albemarle Street, London, 1867.

Edw.d Weller

In the elevated region to the south of the snowy chain lies Crucero, capital of the province, besides the smaller town of Macusani and the village of Ajoyani. In the region to the north of the great chain, and in the upper portion, or as it is called in the country the *cabacera* (or head) of the numerous *quebradas* originating there, are found situated the other towns of the province.

The town of Crucero has a very cold climate, being situated in an open plain, 13,742 feet above the level of the sea. Its temperature during the day does not exceed 55° 40′ Fahr., and at night in the month of August, one of the coldest, it has been known to descend to 12° 20′ Fahr.

An opinion may be formed of the climate of the capital of the province of Carabaya by the meteorological tables in the Appendix.

In these elevated regions the temperature varies greatly: it is sufficient that the sun be obscured by dense clouds to cause the temperature to fall considerably, as may be seen by comparing the observations of 4th October with those of the 29th of same month.

Macusani is the most elevated village in the province of Caravaya, being 14,222 feet above the level of the sea. The other towns of the province situated to the north of the snowy chain enjoy a more temperate climate than the capital, and are situated between 6000 and 11,500 feet of elevation.

Descending by the various ravines, at the heads of which the towns are built, the hot valleys are entered, where coca, coffee, sugar-cane, and other products of tropical regions are cultivated. In these valleys the temperature gradually increases, in travelling towards the eastern plains, until the River Inambari is reached, which is the lowest part of the province. On the shores of this river in the month of September (the end of winter) the temperature during the day exceeded 80° 60′ Fahr., and during the night was 64° 40′.

The upper portions of these narrow ravines do not offer many difficulties to the traveller, for although the roads are sufficiently bad, they are transitable on horseback; but if the journey is continued downward to the forests, then the difficulties begin, and one is obliged to go on foot by escarped paths, full of *mal pasos* (dangerous spots): finally, if it is desired to penetrate to the River Inambari by the *quebrada* of San Gavan or by Esquilaya, the expedition is not only very difficult but even perilous, for no path whatever is to be found, and the explorer is exposed to be wounded or killed by the arrows of the Chunchos Indians or other savages who wander about the forests.

The *quebradas*, the description of which is the object of this memoir, are situated in the western part of the province, and the

rivers that flow down them have different names in different portions of their course. As all the maps and descriptions hitherto published relating to the course of these rivers are more or less incorrect, I will here give the results of my observations.

The river known as San Gavan, in the province of Carabaya, has its origin to the south of the Cordillera Nevada, by the union of the stream that passes by the town of Macusani with that which goes by the town of Corani. The river thus formed traverses the Cordillera Nevada by a narrow and deep pass; it then runs by the foot of the town of Ollachea. At 5 or 6 leagues lower down it receives an arm from the left, which descends from the *caserios* or habitations of Chia and Quicho. At this point it commences to take the name of San Gavan, which it preserves until it joins the Ynambari.

In a work published in Paris in 1861, 'Scènes et Paysages dans les Andes,' the author, who signs himself *Pablo Marcoy*, gives an account of an expedition he made by the *quebrada* of Marcapata, in search of the town of San Gavan, and says that the River Ollachea unites with that of Marcapata; which is absolutely false, for I have followed and personally seen the junction of the River Gavan and the Inambari.*

The River Ayapata, less powerful than the preceding, rises in the Cordillera Nevada or elevated Andéan ridge, already mentioned as dividing the province of Carabaya into two parts, and, descending towards the north, passes by the town of Ayapata and takes the name by which it is here designated. One league further down it joins the Ituata, which enters from the right; it then receives other rivers, and passing by the *tambo* (traveller's resting-place) of Esquilaya, changes its name, being known from this point as the River Esquilaya, which it preserves until it enters the Inambari, without reuniting with either the Ollachea or San Gavan.

On the 16th August, 1864, I left Crucero to visit, first, the head-waters of the Ayapata and Ollachea, directing my steps towards the town of Macusani, a distance of 13 leagues N.W. by W. The road goes to the right of the River Crucero along a considerable plain covered with small gramineous plants, in the direction of an elevated mountain called Kenamari. Some three leagues from Crucero the plain is left, and, retiring from the river, an ascent is made so as to cross some ramifications of

* Marcoy's work contains many other inaccuracies, and should be looked upon as the product of a vivid imagination, rather than as a truthful composition. It is to be lamented that so able a writer, and one who has had the opportunity of visiting unexplored regions, has employed his talents in a work of such a class, deviating so much from the truth, when he could, by faithfully describing countries so new as Peru, have interested the readers much more than by fantastic stories.

the great Nevada chain, from which descend several streams tributary to the River Crucero. The march is continued among mountains until the *Caserio* of Ajoyani is reached, placed in an open plain at 13,595 feet above the level of the sea. At this place several streams unite and form a small river, which runs also into the Crucero.

From Ajoyani there is a continuous rise, passing near and to the right of the snowy peak of Kenamari which consists of trachytic rock, and forms part of a transverse chain which unites the eastern and western cordilleras, forming towards the west the great mountain knot of Vilcanota. The most elevated portion of the road is 15,911 feet above the level of the sea, and serves as the watershed between the streams that descend to Lake Titicaca, and those that flow towards the Atlantic. From this point a most beautiful and imposing panoramic view is obtained. On the right is seen the vast extent of the elevated Cordillera Nevada, with its immense masses of eternal ice, dominated by the huge mountain known as *Allin-Ceapac*, very little inferior to the famous peaks of Sorata and Illimani, found to be in the continuation of the same chain, and belonging to Bolivia. On the left is observed another chain, projecting here and there in icy peaks; these belong to the already mentioned Vilcanota knot.

Continuing our journey, a descent is made to a plain extending between the two chains of snowy peaks, on both sides of which descend various streams, so as to form the small river that passes by Macusani, which, as we have said, unites with the Corani, and forms the river Ollachea, or San Gavan. Thus all the waters that flow down into the plain of Macusani cross the Cordillera Nevada to go to the Inambari.

The town of Macusani is on the right bank of the stream, and at an elevation above the sea of 14,223 feet. The business of this town is the preparation of *Chalona*,* which is its principal article of commerce with the other towns in the province. It was in this town that the Cura Cabrera twenty years ago obtained *mestizos*, or hybrids from vicuñas and alpacas, of which at the present time there may be some seventy in existence.

Macusani, although situated at a greater elevation than Crucero, has not a colder climate; this is owing to the circumstance that it lies in the bed of a *quebrada*, and not in an open plain like Crucero.

As there is no road to Ollachea along the banks of the river

* In Peru *chalona* is the name given to mutton that has been salted and dried, or rather to the whole sheep. In Macusani *chalonas* are prepared without the bones; these are called *salpresas*.

at the point where this cuts through the Nevada chain, I decided to go from Macusani to Ayapata, so as to visit the source of the river Ayapata, and thence pass to Ollachea, traversing an elevated ramification of the Cordillera which divides the ravines of Ayapata and Ollachea.

The town of Ayapata lies nearly north from Macusani, and the road has a general N.N.E. direction to the summit of the Cordillera, and from this point to Ayapata N.N.W.

Leaving Macusani, the plain lying between the two chains is crossed; there is then a continual rise straight to the eastern Cordillera, which appears to the observer as a high and impenetrable barrier; but on nearer approach, it is seen that the land is elevated gradually, and only in the highest part is there much inclination.

One and a half league from Macusani two small lakes are passed, and a little further on, at the base of the Nevados, another lake is skirted, called Socallacocha, the blue waters of which pass to the other lakes to form a small river, which goes to Macusani.

The most elevated portion of the road is distant from Macusani three short leagues, and the pass of the Cordillera is not at much elevation, because the road passes through an opening between the icy peaks that rise on each side. The altitude of the pass is 15,546 feet above sea-level, being lower than the one on the road from Crucero to Macusani, which connects the ramification of the Cordillera of Vilcanota, the eastern Cordillera forming a sort of knot.

Arrived at the culminating point of the road, the track forms a sinuous path, skirting some small lakes, after which the descent soon commences.

There is little or no vegetation on the summit of the Cordillera, it being reduced to such plants as the *Yareta* (*Azorella crenata*, Pers.), which grows among the rocks; the *Geranium sericeum*, Will., and the *Senecio humillimus*, Schultz. But it augments as we descend, when the *Seneceo calcitioides*, Schultz; *Senecio Ayapatensis*, Schultz, and the *Bowlesia lobata*, R. and P., appear. A little lower down commences the cultivation of the potato, and a few huts are seen here and there. Vegetation continues to increase, and the following plants are seen growing:—*Plantago sericea*, R. and P.; and *Gnaptalium melanospheroides*, Schultz; *Merope Schultzii*, Wedd.; *Læstadia Lechleri*, Wedd.; and some Lupins, *Hediotis Oldfersia*, *Calceolaria*, *Chætogastra*, &c.

The road is now a little better, along the edge of a river formed by the streams descending from each side; dwellings become more numerous, cultivated lands are of greater extent,

and some trees of *Berberis monosperma*, R. and P., and *Agapatensis*, Sechler, with bunches of flowers of a beautiful yellow colour, give some life to the scene.

In this quebrada are cultivated, the potato (*Solanum tuberosum*, Lin.), and the Tsaño (*Tropæolum tuberosum*, Lin.); the inhabitants manuring the land with the ashes obtained by burning all the branches, sticks and leaves they can collect.

After having progressed a little more than three leagues from the *Cumbre*, or summit, a river is passed nearly equal in size to the one followed hitherto, and which descends from the Cordillera that divides the towns of Ayapata and Ollachea; then soon commences the ascent to Ayapata, distant about half a league.

Ayapata is one of the better peopled districts in the province; its population in 1862 being 2369. The town lies 11,826 feet above the level of the sea; it has a square plaza surrounded by small trees of *Sance* (*Sambucus Peruvianus*, Bompland). On one side of the plaza there is a large house belonging to Señor D. Agustin Arragon, the owner of an estate in the valley of San Gavan, where sugar-cane is cultivated for the manufacture of aquardiente.

The town of Ayapata is subject to *neblina*, or mist, generally towards the evening. It is so dense that objects are not to be distinguished at a few paces off, and it intercepts the light to such an extent, that in the houses artificial light has to be resorted to early in the evening.

Nearly all the towns situated on the eastern slope of the great chain, and between 8000 and 12,000 feet above the level of the sea, have this inconvenient visitation of the *neblinas*.

The phenomenon is owing to the currents of air being in one direction during the day, and in another during the night, thus forming a sort of atmospheric ebb and flow. In the morning the elevated portions are free from mist, and on the contrary, the lower and hot parts are filled with a dense stratum of vapours, which, seen from above, looks like an ocean of cloud at one's feet.

The elevated portions of land being at these hours exposed to the first rays of the sun, are heated, and a current of air from the lower and hot parts is thereby caused. The sun at the same time gradually heating the lower region, and evaporating a large quantity of water, the air becomes charged with vapours, and the aërial current which has been established from below upwards, goes on taking continually new vapours towards the elevated parts, which go on accumulating; but as the sun's action has heated the atmosphere of this region the vapours become dissolved in the air, until the evening, when the

atmosphere becomes cold, and then the vapours are in part condensed, and become visible, appearing in the form of *neblina*, or mist, which becomes more and more dense by the accumulation of the vapour that comes from below. Night arrives, the sun's action has ceased, the atmosphere gets colder even in the lower parts, and then commences a contrary current, to establish atmosphere equilibrium, filling the void produced by the dilatation of the air by the action of the sun during the day. Moreover, the aqueous vapours suspended in the atmosphere of the elevated regions, in consequence of the lower temperature of the night, are condensed into water, which falls upon the earth, and the air becomes dry, so that by the morning the elevated parts in the dawn are free from mist. These constant mists cause the climate of Ayapata to be very damp, producing a disagreeable sensation.

At the foot of the town of Ayapata passes the river, which we have already mentioned as originating in several lakes in the Cordillera. At one and a quarter league from this town it receives another small river, called Yungamayo, and one league lower down, from the right, the river Ituata.

The 20th August I left Ayapata, directing my steps towards the towns of Ollachea and Corani, so as to discover what rivers were tributary to that of San Gavan. The distance between Ayapata and Ollachea is 7 leagues, and the road consists of a long ascent and steep descent. The first portion of this road—that is, from Ayapata to the culminating point of the ramification of the Cordillera separating the two towns—is not very bad, but from thence to Ollachea it is very bad, being a succession of steps descending to the river.

Nearly the whole way the direction is easterly. The river of the *quebrada* passes half a league before arriving at Ayapata, coming from Macusani.

Leaving Ayapata, a journey of 1 league brings us to a lake half a league in length. A little further on the road becomes more inclined, and traverses a district of metamorphic slate formation; below, to the left, another lake is visible, the waters of which have a milky appearance. Continuing the route, another lake is skirted, and journeying onwards the way lies over granitic rock which intervenes across the slate. On ascending vegetation diminishes, and, at a certain elevation, is reduced to a few clumps of *Gentiana primulifolia* and *sedioides*.

Some 3 leagues from Ayapata the ground becomes more broken, and, passing near to two other lakes, the ascending path lies over layers of slate nearly vertical. The most elevated portion of the road is then reached, 15,043 feet above the level of the sea.

From this spot the descent commences by a narrow gully, over very rocky ground, to the quebrada of Ollachea. Vegetation, that had nearly disappeared, returns little by little, when various bushes appear of *Hesperomeles*, *Croton*, *Lobelia*, *Baccaris*, *Aralia*, *Gay Lussacia*, and *Momuna*; and a little lower down these plants are replaced by others of larger growth, of *Vallea*, *Mirsine*, *Bocconia*, *Chætogastra*, &c., the luxuriance of which increases until the town of Ollachea is attained, which gives its name to the river.

Ollachea is a small place, built on a tract of level ground elevated a few yards above the river, and 8938 feet above the level of the sea. It enjoys a temperate and agreeable climate, and is not subjected to the dense mists of Ayapata. Its atmosphere is, nevertheless, rather damp, favouring vegetation very much, so that the public square and streets are covered with a carpet of green, composed principally of a species of *Senebiera*, called Añucarra, and a small *Agrostis*.

In the vicinity of the town is found a warm spring, rising out of a formation of limestone, *gres*, in vertical layers. This water has no odour, is transparent, and has a slight saline taste. Its temperature when it issues from the rock is 69° 4′.

The river Ollachea, which, lower down, takes the name of San Gavan, issues from a narrow quebrada, which widens a little near the town and afterwards again becomes narrower, continuing its course between rocks.

The 21st August I left Ollachea for the homesteads of Chia and Quicho, with the object of discovering the sources of the other rivers that form the San Gavan by their union with the Ollachea.

Leaving Ollachea, we ascended the right bank of a stream that comes from the west. Although the track in general is very bad, the attention of the traveller is called away from it by the variety and contrasted colours of the flowers that successively come into view; among which may be noted species of *Rubus*, *Durantha*, *Cleome*, *Croton*, *Boralea*, *Carica*, *Cassia*, *Tagetes*, *Barnadesia*, *Hediotes*, *Bomaria*, *Calceolaria*, *Polymnia*, *Berberis*, &c., &c.

The rock on the track continually changes, now showing slate, then porphyry, farther on diorite, and lastly, at the summit, 5 leagues from Ollachea, appears a metamorphic *gres*, upheaved by diorite, and covered at some points by masses of ice of 30 to 40 yards in thickness. The road offers to the traveller the most beautiful views. At the highest part are seen immense mountains covered with snow, their white and inaccessible summits piercing the clouds. In this frigid region life is represented only by a few plants, among which are

Culcitium glaciale, Meyen and Walp., *Perezia nivalis*, Wedd., and some clumps of *Azorella*. The most elevated part of this road is 15,709 feet above the level of the sea.

After journeying a long distance between snowy peaks a lake is skirted, and, after crossing several times a stream which comes out of this lake and descending a considerable incline, the *caserio*, or village of Chia, is attained. Many streams descend from both sides into the quebrada and are crossed on the way.

The river Chia, formed by the union of all these streams, 2 leagues lower down unites with another coming from Quicho, and then flows onward to the river Ollachea, incorporating itself with this last 5 leagues below the town.

Chia is a collection of habitations, 11,440 feet above the level of the sea, and consequently in a cold climate. The inhabitants are employed in the breeding of *gavado*, or cattle; they grow the best and largest potatoes in the department.

In the vicinity are to be seen the ruins of an ancient town of the times of the Incas, and the *andenes* (or hanging gardens built on the slopes of the mountains by the old Indians) are still used.

The geological formation of Chia is Silurian slate.

From Chia to the *caserio* of Quicho is less than 3 leagues, the road ascending as far as the source of a stream along which it runs, and then descending on the other side to the ravine of Quicho. This valley has a more powerful stream than that of Chia; the two unite 3 leagues below the *caserio*, and flow onward, as before mentioned, to the river Ollachea.

The villages of Chia, Quicho, Palca, and Yvipata form a part of the district of Ollachea and take the general name of Asaroma, which has been erroneously placed in some maps as that of some town. The lands of the Asaroma produce the best potatoes in Peru.

The villages of Palca and Yvipata are situated in other ravines, the waters of which do not enter the river Ollachea, and it is believed that they join the Marcapata in the department of Cuzco.

Quicho lies 12,667 feet above the level of the sea, and between two streams, which join near the chapel with another that descends from the heights of Palca.

From Quicho to the town of Corani there are 7 leagues of road in a south and south-east direction. Leaving Quicho, there is an ascent by a small ravine following a stream to its source. Two leagues from Quicho we reach the most elevated point on the road, 15,301 feet above the sea. This point serves as a divisional line between the waters that flow downwards into the Quicho River and those that go to form the Corani.

From the highest point of the road there is a descent to a plain containing three lakes; the first is very small, the second half a league in length, the third the smallest. These three lakes are the sources of the river Corani, but the road does not lie along its banks because the stream passes through a very narrow ravine; the path is therefore over the heights, thence descending to the river at a short distance from the town, which is entered passing over a stone bridge of one arch.

Corani is a small town on the right side of the river, and at the foot of a formation of trachytic conglomerate. Its climate is rather cold, being at an elevation of 13,074 feet above the level of the sea. This plain is very badly supplied, and its inhabitants cultivate only potatoes and rear a few cattle.

The river Corani, at 2 leagues' distance farther down, or below the town, unites with that which comes from Macusani, and, joining, forms one river, which runs in a deep ravine, cutting through the Nevada chain; it then passes by the foot of the town of Ollachea, flowing towards the interior, and farther down receiving the name of San Gavan.

After having visited the sources of all the rivers which by their union form the Ollachea, I returned to the town, with the intention of travelling down the river as far as possible.

From Corani to Ollachea the distance is 6 leagues, 3 of which are a continual ascent until perpetual snows are reached; the other 3 form a descent to the town. On this route is passed the mountain of Ucuntaya, celebrated for its rich silver-mines, discovered at the beginning of the last century. At present they are abandoned, in consequence of the works having fallen in and killed several of the miners.

The river Ollachea runs through a ravine so narrow that in many parts there is no room for a road; consequently, in following the course of the river it is requisite to walk along a very narrow and sloping path, far above the river, continually ascending and descending. Some few leagues further down, the ravine becomes still more precipitous and the path disappears, so that there is no possibility of passing along the course of the stream. At present a distance of 4 leagues only can be reached, as far as the points known as Tavipira and Chuani.

In descending the narrow valley, vegetation rapidly becomes more luxuriant, and the variety of the flowers would add to the beauty of the best gardens. A short distance from Ollachea the lovely *Amaryllis reginæ* grows wild, besides the elegant *Canna iridifolia*, several beautiful species of *Thibaudia*, *Gay Lussacia*; *Gualtheria brachibotrys*, Wedd. and *vaccinioides*, Griesb.; *Vaccinium pernettioides*, Griesb.; *Cuphea cordata*, R. and P.;

Serodaphyllum augulatum, Poiv.; many species of *Piper*, *Philodendron*, *Aralia*, *Momina*, &c.

Rather more than two leagues from the town the ravine appears as if it were completely closed by a high wall, of more than 200 feet in height, formed by almost vertical layers of limestone, and in a direction transverse to the river. Behind this gigantic natural wall are seen the mountains, covered with forests, and a stream that comes falling from a height forms cascades of white foam, giving life and beauty to the sombre green hues of the forest scene.

At this point the river describes a curve, and runs across the vertical layers of limestone by a sort of narrow pass. Further on the path becomes narrower, and follows the margin of the river, the water of which ofttimes covers the path, until arrival at a spot where the valley becomes a little more open, and forms the Pampa of Chuani. It then closes in again a little further down, and the road terminates.

The Pampa or Plain of Chuani is somewhat low, being 6915 feet above the level of the sea.

Although the River Ollachea, as we have already observed, is the same stream that lower down is called San Gavan, it is necessary, if we wish to follow the course of the San Gavan, to return to the town of Ayapata and take another road, there being no path below the Pampa of Chuani even when on foot. Thus, after having descended by the quebrada of Ollachea as far as I could, I had to return to Ayapata, and take the road that enters the Valley of San Gavan. On the 30th August I left Ayapata for this valley.

Leaving Ayapata, the general course is N.N.W., descending to the River Yungamayo, the waters of which at a little distance join the main stream; that is, at a little more than a quarter of a league from the town. An ascent is made on the other side until arriving at a height called Apachecta de Ecaco, one league from Ayapata. There is next a descent, and subsequent ascent, and many streams are crossed which form a river, which, far in the interior, joins the Ayapata or Esquilaya, under the name of the Quillabamba. The ascent continues as far as an elevated point called Alto de Compoccosi. From this height there is a descent passing two other streams, which, like the former, take their waters to the River Quillabamba. Near the last stream there is a shepherd's hut, and the spot is called the Vaqueria. From this point all the streams passed flow downwards to the San Gavan. In these elevated regions there is not much vegetation, but the following, among other plants, were noticed:—*Erigeron hieracioides*, W.; *Ranunculus Gusmani*, Humb.; and some *Gentianas*.

From the Vaqueria the track continues, skirting rather undulating country, and descending some two leagues to the ruined Tambo of Sachapata. Near the tambo a large stream is passed, and continuing on for a few cuadras we come to the tambo of Quitonquiton, where the night is generally passed.

In the province of Carabaya the name of Tambo is given to the thatched or covered resting-places, constructed in the uninhabited regions, which serve to shelter the traveller from the inclemency of the climate, at least during the night.

In nearly all the narrow valleys in the province of Carabaya the first tambo met with descending from the Cordillera to the hot valleys is called *Sachapata*, a Quichua word equivalent to "portal of the forest;" now *Sacha* in Quichua means forest, vegetation, a wood, &c., and *pata*, a small and elevated plain, namely, a table-land. This word *Sachapata* indicates the point where the sterile and cold elevation ends, and where vegetation commences. Consequently in all the *quebradas* of that region the place denominated Sachapata indicates the entrance to the luxuriant wooded valleys.

From all the points of Carabaya that have this name, when the atmosphere is clear, the most beautiful views are obtained, and the most enchanting panorama imaginable is presented at the feet of the traveller. A sea of green foliage spreads out before him, embracing a vast extent of country, extending to the great forest-covered plains in the distance, through which wind the numerous rivers in serpentine courses.

But, unfortunately, this magnificent sight can seldom be observed, for dense white vapours cover these immense tracts and the traveller only sees at his feet a vaporous ocean, out of which here and there are thrust up, like small islands, the summits of mountains covered with vegetation.

The tambo of Quitonquiton is 10,973 feet above the level of the sea, where it is still cold. It is in the form of a large rectangular apartment, with stone walls, and built in an open place, covered with small plants of *Hesperomelas* and of *Vaccinium floribundum*.

A few paces from the tambo commences a very steep descent by a narrow cutting, the sides of which are covered with verdure. Ferns and Lycopodiums soon make their appearance, followed by Clusias, with their fleshy leaves, and the *Macrocnemon corymbosum*, remarkable from its large leathery leaves.

The road as we advance becomes very bad, consisting of stone steps, for the most part very unequal, so that long distances have to be travelled on foot.

The vegetation continues to wear an alpine appearance; all the trunks of the trees are covered with mosses and hepaticas,

and now and then a small tree of *Chinchona ovata* is noticed.

At a good league's distance from the Tambo of Quitonquiton another shelter is reached, called Sachamacara; it lies 9082 feet above the sea-level.

From Sachamacara the road continues by the ridge of a mountain in the midst of tree-ferns, *Clusias*, *Scrodaphyllum*, &c. At the sides of the road numerous mosses and lycopodiums cover the ground, and in the midst of this carpet of cryptogamic plants peep forth shrubs of *Viola acaena*, *Bomaria*, *Vaccinium*, *Pernettia*, &c.

After one and a half hour's march from the tambo of Sachamacara we arrive at Cerakunca, whence there is a magnificent view of the great sea of foliage.

Another league lower down is the small tambo of Tatanara, situated in a small opening surrounded by thick forests. The climate here is temperate, the place being situated 7143 feet of elevation above the level of the sea.

From this place we descend to the tambito of Huayruro-kunca, observing in the road a few plants of *Citrosma*, *Tafalla*, *Erythrina*, and *Chinchona coccinea* (?).

The tambo of Huayruro-kunca is 4431 feet above the sea-level, and in in its vicinity are seen many small trees of *Cascarilla magnifolia*, Wedd. The heat is now becoming more and more felt, vegetation is more luxuriant, and trees are now observed of considerable size.

Progressing onwards, the elgant Cecropias begin to appear, with their broad leaves like parasols, and also Heliconias, with their beautiful bunches of tri-coloured flowers, and gigantic grasses of the Bambusa group.

The land becomes more level, and now some cultivated coca patches are seen, and there is presented for the first time to the sight the Rio Grande of San Gavan, at a point called Chacamayo, about a league from the last tambo. From Chacamayo to Sangari is half a league, at which place in other times there was an estate, now abandoned.

Sangari is 2909 feet above the level of the sea, in a climate where coca, sugar-cane, and coffee, can grow. In the vicinity are observed beautiful *Siphocampylus*, *Sidas*, *Amaryllis*, *Chinchona Boliviana*, Wedd., and *Purpurea*, Pav.; *Laplacea Quinoderma*, Wedd; and a fine *Rubiacea*, with rosy *Bracteas*, belonging to the genus *Howardia*, recently created by Dr. Weddell in honour of the celebrated English Quinologist Howard.

Leaving Sangari, a river is passed which comes from S.S.E., after which the route is by a very bad and narrow road, excavated in compact metamorphic slate.

At a short distance is seen a river, which comes in from the opposite side to that of San Gavan; then some streams are passed which fall over rocks; we then arrive at the tambo of Pacañusi, one league from Sangari.

The Tambo of Pacañusi is very small; it is on a beautiful plain, where there was formerly an estate, but where a plantation of coca is now all that remains. In the neighbouring wood there are some coffee-bushes and plantains that have become wild. The land of this estate is very stony, which appears to have been the reason of its abandonment.

Leaving Pacañusi some streams are passed, then the great river of Turaccaca, which joins the San Gavan at a few cuadras of distance. The River Yuraccaca descends from the heights near to the tambo of Sachapata, receiving in its course a multitude of streams, and when it increases by reason of the freshets it is impassable. Generally there is here a poor sort of bridge composed of sticks; but when I was there I had to cross the river, attended by danger, by fording.

The road is continued on the other side of the river by a narrow pass, passing some streams, and progressing at times through the dark forest, at others over clear country, until I reached the hacienda of S. José de Bellavista, one league from Yuraccaca.

This hacienda or farm belongs to D. Agustin Arragon, an enterprising and intelligent man, who at various times has entered these valleys, now collecting cascarilla, now working lavaderos of gold in the River Piquitirí, now collecting *Jebe* or India rubber, to make clothing impermeable to water. His exertions, however, have not been repaid with much profit.

The farm of Bellavista was founded some twenty years ago; sugar-cane is cultivated, from which treacle and spirit are prepared, and sent to Ayapata for sale.

This spirit or *Aguardiente* is forwarded in tinned copper vessels, two of which holding, say fifty pounds' weight, are carried on a mule.

On this estate are cultivated, besides coca, coffee, pine-apples, and Indian corn; this last serving as bread for the peones or labourers, who come in to work, and which is sold to them for about five shillings the 25 lbs.

The labourers who work here are Indians from the towns of Ayapata and Ituata, hiring themselves for thirty working days at about two shillings a day. If these labourers are economical and take their own provisions, at the end of thirty days they receive 15 dollars, or about 3*l.*: on the contrary, if they receive provisions from the farm, which consists of *Chalona* or dried

mutton, sold at about five shillings the sheep, maize, chuño, &c., the value of these is subtracted from their 3*l.* per month.

The valley in which the farm of Bellavista is situated is called San Gavan, in consequence of a groundless tradition that there existed once in the vicinity a very rich town of this name teeming with gold, and that it had been destroyed by the Chunchos or savage Indians. Although there have been writers who have even stated the very day on which the invasion of the Chunchos took place,* I do not believe such a town ever existed.

It is true there once existed a small province named San Gavan, which a long time before 1767 was joined in part to that of Carabaya, in part to the province of Larecaja (now Bolivia), to Azangaro and Lampa; but this does not imply that there existed a town of this name.

There are no grounds for believing in the existence of such a town of San Gavan, but various maps give this name to a river; for example, in a small MS. map in the Museum at Cuzco, the date of which is not known, the name of San Gavan is given to the river Ollachea, as it is at present actually known there. In Carrasco's map of 1801, the River San Gavan is the same as the Huari-huari, the source of the Inambari. In another old map, which belonged to the late cosmographer of Peru, D. Eduardo Carrasco, which I possess, are to be seen marked the old missions, abandoned for many years, and there is observed written *Valley of San Gavan*, in the region traversed by the rivers Ollachea and Ayapata, but in none of the maps have I seen any point fixed corresponding to the existence of a town. Lastly, in Alcedo's dictionary, published in the last century, there are even given the boundaries of the province of San Gavan, which do not correspond with the position of the valley of San Gavan placed on the maps.

All these contradictions make me doubt in the existence of a town called San Gavan. I believe that this imaginary town has been confounded with the Aporoma, which is proved by documents not only to have existed, but to have been very rich in gold, and to have had a large population. Still this town, as well as that of San Juan del Oro, have not been destroyed by the invasion of savages, but by the slow decay of the mines.

The farm of Bellavista is in a beautiful plain, on the right bank of the river called San Gavan, and 2,442 feet above the level of the sea.

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* M. Paulo Marcoy, in his 'Scenes des Andes,' says that during the night of the 15th to the 16th of December, 1767, the town of San Gavan was invaded and destroyed by the Carangas and Suchimanis Indians, which is but a dream of his imagination. It is to be deplored that his work has led conscientious authors into error, as Mr. Markham, in his important work 'Travels in Peru and India.'

There are here no venomous animals as in other places; jaguars and other beasts of prey also are not found; so that dogs may be kept, which is not the case in the forests of Chanchamayo and Huánuco, where dogs find implacable enemies in the wild animals of the feline genus. Sand-flies are not abundant, but there are plenty of mosquitoes.

A pest, common to other Peruvian valleys, are the swarms of bats, who suck the blood of man and beast; thus it is found impossible to keep animals for the saddle or for burden, or cattle of any sort, for they become thin in a few days. Each beast will receive two, three, or more bites during the night; besides the blood the bat sucks, a large quantity runs from the puncture, so that the animal loses more blood in a night than it can reproduce by its scanty food.

The absence of cattle and fresh meat renders it difficult for the labourers to exist here for any length of time without falling ill, and it is for this reason they only contract to work for thirty days.

In nearly all the forest portions of Peru, and when there is a scarcity of fresh meat, the labourers are exposed to contract an illness they call *Opilacion* (chlorosis or obstruction); a species of *anemia* or want of the plastic matter of the blood, manifesting itself in paleness of the countenance, a discolouration of the gums, loss of strength, and at times by general swelling (*anasarca*). The labourer attacked with this disease cannot work at any employent.

The farm of San José is the last civilised settlement before reaching the country peopled by savages in the province of Carabaya, consequently it is exposed to be attacked and destroyed by these barbarous neighbours; indeed the Chunchos Indians have invaded the farm and killed people. A few years since a party of savages came and encamped at a small station named Cayapi, half a league from San José, with the intention of assaulting the latter; but a gun casually fired off put them to so rapid a flight that they left their bows and arrows on the road. In 1851, when D. Andres Richerte was administrator, the Chunchos came to San José and killed a woman. In 1862 they made another attack, and killed with an arrow a labourer named Basilio Zarate.

The Indians who descend to work at the hacienda of San José hold the savages in great fear, and suppose every now and then they hear the cries of the Chunchos on the other side of the river, or see the smoke from their fires: indeed, it is with difficulty that labourers are obtained to work on the hacienda.

Being desirous to ascertain the exact point where the San Gavan entered the River Inambari, I endeavoured to find

among the labourers of San José some who had the courage to accompany me. With some difficulty I obtained Indians to convey what was necessary, and a youth named D. Juan de Mata Riquelme, who had been administrator of the hacienda, volunteered to accompany, and share the sufferings of every sort to be encountered in so hazardous an expedition.

Those only who have explored the dense forests of Peru, in so broken a country as this of Carabaya, can form an idea of the difficulties that present themselves. In our case was to be added the risk of meeting a party of the savages who live in the neighbourhood.

I left San José on 7th September, taking provisions for fifteen days. Marching on foot by a narrow path, which continues only to the little abandoned farm of Cayapi, half a league distant, we passed on starting the river Chaquimayo, which had but little water.

The road runs at a short distance from the river, which at this point has a strong current, and forms large waves.

Among the trees I observed were the *Chinchona purpurea* (Pav.) and the useful *Carludovica palmata*, R. and P., from the tender leaves of which is prepared the material of which the Guayaquil hats are made. This plant has different names, according to where it is found in Peru; in Carabaya it is called *Ramo*.

Half a league's distance is Cayapi. There are no residents, but a *cocal*, and a thatched habitation for its owner at the time of the coca harvest, which is called the *Mita*.

On leaving Cayapi all trace of a route disappears. At a few steps' distance a large stream is crossed, then the shore of the main river is followed. We had not gone many furlongs when a great obstacle presented itself which completely impeded our march; there was an end to level ground, and the river washed the base of a high *barranco*, or escarped naked rock.

The river being wide and not fordable, it was impossible to cross to the other side, and we had no help but to climb the precipice. Two of the Indians, who were old Peruvian bark-hunters, and accustomed to such obstacles, began to construct a ladder of branches of trees. All laid down their loads and shared in the labour; some cutting with their *machetes* the long pieces for the sides, others the short ones for the steps, while others, again, sought for lianas called *Mora*, to serve as ropes to bind the ladder together. In a moment the uprights were placed in position, the first steps were then fixed, and climbing on this the others were tied, one after the other, until the ladder was completed. But as the barranco was very high, and the ladder did not reach the summit, it was directed to an overhanging

ledge of rock. The Indians climbed the first ladder, taking materials up to make a second which should reach to the top—a perilous operation. The Indians loaded themselves, and began fearlessly to climb by hands and feet; we followed, and got safely to the top. We then continued our route through the forest by a declivity so steep that we were in danger of sliding off into the river. We made but one league to-day, passing the night on the shore of the River San Gavan. As a protection from the rains during the night, the Indians constructed a *ramada* or hut of branches, covering it with leaves they may find at hand, even making it water tight. It is astonishing to observe the dexterity with which they construct these ramadas; accustomed to deal with nature, they know how to take advantage of everything. The forests afford all they require. They are thatched in Carabaya with the leaves of a palm called *Camo*, a species of Iriartea, which they split longitudinally down their leaf-stalks, placing them in such a manner that the ends of some cover the bases of others, like a roof of slates. In nearly all the forests of Peru they generally use the leaves of the *Phytelephas macrocarpa;* but in Carabaya this palm is not known, so the Camo is substituted.

The thatch being laid on, the ground is strewed with the same leaves, which serves as a bed and keeps the traveller from the damp earth.

To-day we continued our march, following the course of the river, without diverging much from it; but, as the ground was very broken, we kept as much as possible to the very brink of the river; but when any obstacle presented itself we had to enter the forest, the Indians first with their machetes opening the way. Our course varied continually; we went north-east for some furlongs, then east, and N.E. by E.

After going half a league another steep cliff was encountered and the same system of ladders was resorted to, descending to the river, when our march for a few furlongs was to the north.

The geological formation is slate, in places visible in nearly vertical layers. Vegetation is exuberant, and the branches of the trees and shrubs so interlaced that they form a thick network requiring the machete to clear a path. Many species of *Urostigma* and *Pharmacosycea* throw out roots which, coming down from elevated branches to the ground, throw out other roots, and these become so many trunks; one plant thus at times covers a large space of ground, presenting itself under the most capricious forms. Many species of the same genus *Urostigma* are useful; some, known under the name of *Layo*, have a strong fibrous bark, which is made into ropes by the Indians; others produce *Jebe*, or India-rubber. There are

innumerable species of palms, tree-ferns, canes, *Cecropias*, *Erythrinas*, *Cedrelas*, *Olmedias*. They grow so near to each other that the branches interlace and form a compact thatch, difficult for the sun's rays to penetrate; thus in some places our march was in darkness.

After having again descended to the river, the course was north-east for some furlongs on even ground through a wood known by the old Cascarilleros as the Pampa de Molina. Then came Machuchacana, where are seen some holes in the rock composing the bank of the main river, and it is thought that in olden times there was a bridge here; still, excepting the holes, which may be natural, there is no positive information to go on.

A small river and some streams are passed. Continuing a south-easterly direction and over slate-rock, and a little further on we camped for the night, having only made two leagues during the day.

We continued our route to the south, the river forming a curve at the base of a mountain. A small stream was passed, and the main river was followed, running between banks of slate in nearly vertical layers. During freshets the river rises two yards higher than it is at present. Now and then we saw small islands in the river covered entirely with vegetation.

At a short distance the direction varies to south-east, and after some furlongs the bend in the river ceases, and the route then lies north-east again. We had great difficulties in making our way through the forest.

After having marched nearly a league, the direction continually varying, we arrived on the shores of the River Piquitiri, which in the dry season has but little water, but is unfordable during freshets. The sand of this river is auriferous, and, higher up, works were commenced having for object to give the water another course, so as to extract gold from the bed with greater facility. Don Agustin Arragon, owner of the farm of San José, having discovered the remains of these works, was induced to continue the search for gold in this river; but, in consequence of the great difficulties that presented themselves and the little profit, the work was discontinued.

There is no doubt but that the River Piquitiri contains gold; for my followers, having washed some of the sand, took out particles of the metal.

We then forded the Piquitiri near to its junction with the San Gavan, which here runs nearly east and west. After a quarter of a league's march we entered land covered with spiny shrubs so close to each other that they opposed an impenetrable barrier, and it cost us much trouble and time to get through this vegetable wall.

No sooner had we got out of this sort of trap, when a dangerous pass presented itself, where a portion of a mountain had fallen into the river, with all its load of soil and vegetation; the incline by which we had to descend had a layer of yellow mud with stones, which gave way under the pressure of the feet. We felt thankful when we had got over this dangerous spot.

A few steps in advance the ground was deeply cut by a ravine, the stream of which ran into the main river at our feet. The mountain here formed a nearly perpendicular wall, which put a bar to our progress. There was no remedy but to slide down to the shore as well as we could, by the help of ropes, and to lay hold of the roots of small plants that grew out of the crevices of the rocks, suffering from falls and scratches.

We continued by the river-side, crossing the stream, but soon saw that we had got from bad to worse. In a few furlongs there was another precipice, at the base of which ran the river with a powerful current. Worn out and disheartened by this day's painful march, the sight of this new obstacle would have induced us to remain had there been space to lay ourselves down. My companions had not the strength or courage to prepare ladders so as to get over the cliff: perceiving, however, that at a short distance in advance the river-shore was satisfactory, we determined to pass the barrier in some way or other, by clinging to the angles of rocks and bushes that grew in crevices.

It was a strange spectacle, the five weary travellers, loaded with provisions and crawling along the face of a nearly vertical rock, holding on by feet and hands to the smallest object of support. The turbulent river ran below, ready to engulph the unfortunate one, should the fragile support give way. For my own part, perceiving above me many bushes and small trees, I managed to gain them; and then, performing a true arboreal journey, I passed, but not without difficulty, from branch to branch monkey-like, and in the end got to the level river-shore.

We continued our journey for about a quarter of a league to a favourable spot, where we rested for the night, having made only two leagues this day.

This day there were fewer obstacles following the shores of the river, sometimes in the forest which was nearly level, and skirting mountains in a direction N.E., N., and N.W.

After walking a few furlongs we saw the river Azulmayo, which enters the San Gavan from the other, or left, side.

After the confluence of the Azulmayo with the San Gavan, the mountains decrease in size, and then follows a chain of headlands of little elevation.

The river San Gavan, which before the junction of the Azulmayo trended towards the north, now flowed N.N.E.

After a little more than half a league we arrived at the shores of a rapid river called by the Cascarilleros San Trifon, which gave us some trouble to ford. Once on the other side, our course was towards the east.

At the point of confluence of the two rivers, that of San Gavan runs east and west, that of San Trifon south-east and north-west.

A little further onward our march was N. and N.N.E. by the shore of the river. In advance we crossed a small arm of the San Gavan so as to continue our route on an island, after which we returned to the shore of the river. Here the great river flows through a narrow pass of naked rock, but of the same elevation on either side; a bridge could be easily constructed here—the width of the river is some 40 yards.

Continuing our route through the forest for some furlongs, we saw in advance a gleam of light through the foliage, and very soon afterwards came suddenly on an open space where we saw before us a spacious horizon. We had come unexpectedly on a broad quebrada, and at our feet flowed the great river Inambari. A feeling of contentment was experienced by all at finding ourselves so unexpectedly on the banks of this river, which had cost us so much trouble and privation to arrive at.

The river San Gavan at the point of confluence runs from S.S.W. to N.N.E., and the Inambari from S.E. to N.W. In the angle formed by the two rivers the rock is of slate, which is the dominant formation in the province of Carabaya, but at this point the strata are nearly horizontal.

The water of the river Inambari is muddier than that of the San Gavan, and at the junction the Inambari is more than 200 yards in width. The velocity of the current for some distance above the confluence, at the time I visited it, was two leagues an hour.* At the point of junction the rivers are 1570 feet above the level of the sea.

Although the Inambari at this point is not easily navigable on account of its strong current, nevertheless grave difficulties do not present themselves except a little lower down, where large waves are produced by the meeting of the two currents. Navigation might be established for vessels of light draught.

It is to be presumed that the Inambari, until it unites with the river Madre de Dios of the forests of Cuzco, has no falls,

* It is necessary to notice that these rivers vary in the velocity of their current according to the seasons, so that in the months of September and October, in which the rivers have little water, the current is less than at other portions of the year.

neither a sharp incline; because, at a short distance from the confluence of the rivers San Gavan and Inambari, the mountains become lower, until they nearly disappear further in the interior. The elevation of the same point above the level of the sea, as before stated, being 1570 feet, and that of the Madre de Dios, according to the observations of Lieutenant Gibbon of the United States Navy, made in 1851,* at the point of junction with the Piñipiñi, being 1377 feet, there results a difference of 193 feet for distance, which, according to my calculations—bearing in mind the numerous bends described by these rivers in their course—cannot be less than 25 to 30 leagues, equivalent to a fall of 8 feet per league, supposing that the Inambari joins the Madre de Dios at a little distance from the point measured by Lieutenant Gibbon.

All authors, up to the present time, who have written on the Inambari and Madre de Dios, have believed that these rivers form the head waters of the Purus; but it is now beyond doubt that the river Madre de Dios, united with the Inambari, takes the combined waters into the river Madeira. The solution of this important hygrographical problem we owe to the unfortunate Don Faustino Maldonado, of Tarapoto, in Peru, who sacrificed his life in the hazardous navigation of the Madre de Dios. This fact being probably unknown in Europe, I will give a short account of Maldonado's voyage, as it is connected with the subject of this memoir.

On the 5th February, 1861, Maldonado, with seven companions, after having constructed a raft, abandoned themselves, with little or no provisions, to the current of the Madre de Dios, embarking at the confluence of the rivers Piñipiñi and Tono. On the 5th March, after having passed the mouths of many rivers which enter on both sides, principally from the right, they came to a place where the river had a most impetuous current; this obliged them to disembark and go a distance overland, building afterwards another raft to continue the voyage. On the 8th they again embarked, and at a short distance were surprised to find themselves in the river Mamoré, of Bolivia, entering it from the right at a point inhabited by the Chunchos, or Savage Caripunas. On the 18th they were wrecked at a dangerous rapid, which appears to have been the spot known as Caldeirão do Infierno, or Devil's Caldron, where Maldonado, with three of his companions, lost their lives. The remaining four continued the navigation, and, passing by the village of Crato and the town of Borba, passed from the mouth

* 'Exploration of the Valley of the Amazon,' Part II. By Lieut. Lardner Gibbon. Washington, 1854.

of the Madeira into the Amazons. In the city of Manaos or Barra, of the Rio Negro, they obtained a certificate from the Brazilian authorities; they then ascended the Amazons and the Huallaga, returning to their native place Tarapoto.

In the beginning of 1862 the four companions of the unfortunate Maldonado again ascended the Ucayali and reached Cuzco, where they exhibited these certificates concerning their dangerous voyage.

Neither Maldonado nor his companions knew the names of the rivers they passed; and as, according to Gibbon's account of his exploration of the Madeira, in the region inhabited by the Caripunas no great river enters except the Beni, I believe that Maldonado's party entered the Madeira by this river. It results, therefore, that the Madre de Dios, after uniting with the Inambari, joins the Beni, which afterwards combines with the Mamoré to form the Madeira. What confirms me the more in this opinion is, that the account of Maldonado's voyage is in conformity with the particulars of the exploration from the mouth of the Beni, made, not many years since, by a Señor Palacios, by order of the Bolivian Government, which made known that the river Beni, at a little distance from its junction, had one fall—the same that was found by Maldonado on the 5th, when he was obliged to go overland for some distance.

On the other hand, the entry of the river Madre de Dios into the Madeira agrees with the important results of the recent exploration of the Purus made by Mr. Chandless, who has proved that the origin of the Purus is not the Madre de Dios.

Having proved that the Ollachea, or San Gavan, united directly with the Inambari before joining the river Marcapata, as stated by M. Marcoy, in his 'Scènes des Andes,' I was now desirous of following the river upwards by the shores of the Inambari as far as the junction of the Esquilaya, which, as I have before stated, is the river that passes by Ayapata; I then intended to return to that town, following the ravine through which this river flows.

Now that I had been fortunate enough not to meet with any of the Chunchos Indians, I allowed my followers to have a day's rest, whilst I made the observations I have above recorded, and collected some plants and animals in the neighbouring woods.

Near the Inambari chinchona-trees are not observed; they do not grow in so hot a region. The only representative is the *Cascarilla magnifolia*, Wedd., which is able to withstand the range from temperate to hot; for this plant, called in Carabaya

Huiñapo, is also found near the confluence of the river San Gavan.

The *Aroideæ* are very common. There are numerous species of *Philodendron, Arum*, and *Caladium;* that strange plant the *Monstera adansonii*, with perforated leaves; *Syngonium auritum*, Schott, and *Diffenbachia segune*, Schott. Several beautiful species of *Maranta* were also seen, among them the *Maranta lineata, alba*, and *rosea;* various *Cistus, Cyclanthus, Carludovicus;* magnificent *Melastomas*, belonging to the genera *Bleckia* and *Rhexia;* finally, an infinity of *Bauhinias, Angura, Fevillea, Paullinia, Mikania*, &c.

Among the mammiferous animals, the common species are the tapir, peccary, porcupine, and *Hydrochœrus capybara*. Of birds, I will only mention the more useful, as several species of *Crax* and *Penelope*, which yielded us good eating.

On the 12th we were again on the march, skirting, as well as we were able, the river Inambari in a direction varying from S.E. to S.S.E. We soon passed a great stream, after which we entered the forest; at a quarter of a league we found ourselves on a sandy beach, where many palms, of the genus *Iriartea*, grew. We then varied our course to S.S.W. and S., and to S.S.E.

In another quarter of a league, after having passed two streams, we travelled east and north-east, and at a short distance observed a river entering the Inambari from the opposite side, to which my followers gave the name of Chunchomayo; for they thought they had seen some Chunchos, or savages, on its banks. We now passed some small streams, and, going through some forest in a S.S.E. and east direction, we reached a river having very little water, to which was given the name of Rio Blanco; this we crossed and descended to a beach, where we passed the night.

On the 13th we moved in a S.S.E. direction over very broken country and through thick woods for half a league, then descending to the bank of the river we progressed by a branch which was nearly dry, excepting during freshets. This spot is much frequented by tapirs. Not far off was a small river, which entered the Inambari by the other side. The ground was a little more even, with luxuriant vegetation; among the plants still rare in Europe was the beautiful *Calatea Veitchiana*, Hook, which I had first seen on the banks of the Huallaga.

Passing a rivulet, and then, at a quarter of a league's distance, another, we arrived on the banks of a river divided into various arms, which my men called Charari; this we forded at no small risk, for the current was strong. Nearly in front of

the mouth of the Charari, on the opposite side, another river comes in direct from the north.

Continuing our march in a general direction of N.N.W. and S.S.E., at half a league's distance from the river Charari a stream was found; and in another half league we crossed a narrow and dark ravine watered by a small stream, which my men named the River Calabozo. On the track several beautiful birds were seen, including *Cephalopterus ornatus*, with its elegant parasol of feathers over its head; the *Prionites momota*, the *Procnia ventralis*, &c. In front of the little river Calabozo another small stream enters the Inambari from the opposite side.

Continuing our march, at a short distance from the Inambari, our direction was changed towards north-west and south-east, and we travelled nearly a league over land full of shrubs and tangled plants, making our march painful.

As it threatened rain, we halted early, so as to have time to protect ourselves from the downfall. The night turned out miserably wet.

On the 14th we did not start till late, and, after going half a league, we had the pleasure of finding ourselves at the River Esquilaya, which flows by the town of Ayapata. We knew it at once, for we were satisfied there was no other between it and San Gavan which could have so large a quantity of water. This spot was 1833 feet above the level of the sea.

At the point of junction of the two rivers, the Inambari comes from south-east, and its waters are muddy; the Esquilaya comes from south, and its waters are transparent. As these two rivers meet at an acute angle, their waters run side by side for a good distance without mixing, forming two bands of distinct colours. At the point where they join, there is an extensive sandy beach, which, during the freshets, is doubtlessly covered with water.

Here we left the shores of the Inambari, to enter the ravine of Esquilaya, travelling along its left bank, first in a S.S.E. direction, and afterwards S. and S.E. We soon had to take to the woods, and open a track over very rough country; it became late, and we were obliged to halt on a small sandy beach of the River Esquilaya, after having progressed only one league from the junction of the Esquilaya and Inambari.

On the 15th we left the beach where we had slept, and entered the forest, not being able to march by the river-side; but we had not walked a league when serious obstacles presented themselves. Slate-rocks arose on all sides, and the mountains continued so precipitous that it was almost impossible to open a

route. At this point the River Esquilaya runs in a narrow opening of rock, scarcely 25 yards wide.

We had now to consider what was to be done. If we continued on this side for a short distance, we calculated we should come upon the river Quillabamba, the head-waters of which, being on the heights of the road of Ayapata and San Gavan, receives so great a number of streams in its long course, that, when it enters the Esquilaya, it has too great a volume of water to be fordable. On the doubt, therefore, of finding a ford, we dare not continue this route. Some of the men were certain that at a short distance, on the other side of the River Esquilaya, we ought to come upon a small coca-plantation, belonging to the Indians of Ayapata; so we decided to throw a bridge across the river, and continue our march on the other side. We were on the steep slope of a hill, and some 50 yards above the river; so we decided to cut down a tree of sufficient length to reach, when it fell, to the other side of the river. We soon found a tree to suit our purpose; the axe went to work on one side of it, it began to creak, and soon fell with a great noise, taking with it several smaller trees: unfortunately, however, instead of falling across the river, it fell obliquely, and the upper part not reaching to the other side, it was carried away by the stream. We sought at once for another tree, and, having taken better precautions, in an hour the last cut of the axe caused the tree to bend over and fall right across the river, at 100 feet above it. We had now the means of communication with the other side. Still we had some difficulties in crossing our slippery and uneven bridge; but we succeeded at last in getting across, and continued our journey.

I had never in the course of my wanderings experienced so rough and painful a route. The slopes of the mountains we were on were so steep that we had the greatest difficulty to keep ourselves from falling headlong into the river. It was necessary to hold, at every step, by the small trees that grew out of the crevices of the rocks; and, to our sorrow, the trees were partially rotten and broke away from our grasp, causing us to make a false step. The spines and thorns of the bushes tore our hands, and caused them to be covered with blood.

This, indeed, was a day of trouble and incessant labour, and when night came we had no better prospect than to sleep on the banks of a stream which fell over the bare rock. In the hope of finding a better spot, we continued our march, until night came upon us, without our having met with a level space sufficiently large to spread our beds upon; we had finally to sleep almost on the branches of trees, in continual danger of rolling down the slope into the river.

On the 16th, after having passed a most unpleasant night, we ascended a slope in a southerly direction for some furlongs. We then continued skirting the mountains to s.s.w. and s.w., until we came suddenly upon some pine-plants and coca-bushes. One of my men told me that this was the last cultivated spot in the quebrada of Esquilaya towards Inambari, and was called Huallasa.

When we started from San José, we carried provisions for fifteen days; but my Indians, to lighten their loads, had consumed more than the allotted quantity, so that even before ten days had passed our provisions were nearly at an end. Indians, when they accompany travellers on such expeditions, do not go with a very good will, and adopt all methods to secure a return to their homes as quick as possible; for this object, as they are pretty sure that they will not perish of hunger themselves, if they have a little coca and chuño, they bring the traveller to a standstill by consuming his provisions, thus obliging him to return, saying that they cannot go on without food. The Indians who accompanied me did not speculate on returning by the quebrada of Esquilaya, and had eaten up the greater portion of the provisions before we got to the Inambari, so, independently of suffering from the great fatigue of the exploration, we had hunger staring us in the face.

In Huallasa there were no inhabitants. The owner of the place was an Indian of Ayapata, who only came occasionally to collect his little harvest of coca, for the locality was frequently visited by savage Indians, or Chunchos as they are called.

We descended a quarter of a league towards the s.w. to a level tract covered with wood; then marching s.s.w. some furlongs, we arrived at a river called Negromayo, which had a good supply of water. We forded this, and travelled south a short distance, on our way to another river called La Comunidad. Fording La Comunidad, we continued our route through the forest, and, after half a league's march, came to another coca-plantation, near which was an abandoned hut. This place was known as Huerta Pampa, belonging to an Indian of Ayapata.

In front of Huerta Pampa is seen the river Quillabamba, which joins the Esquilaya; but it has a little less water than the latter.

By an anomalous territorial division, the lands situated on the other side of the Esquilaya, and near to the Quillabamba, belong to the inhabitants of Ituata, a place much more distant than Ayapata.

As we found no provisions in Huerta Pampa, we continued our route a few furlongs, and reached another cultivated place, called La Hacienda, where we put up for the night.

Here we found only a few coca-plants and banana-trees,

without fruit; there were a few pineapples and other fruit, all unripe. The habitation here was in a miserable and abandoned state. We were now in a state of starvation.

Leaving this spot, our course was southerly along a slight incline, with a fair route. At a quarter of a league we passed a stream called Lucullamayo, and continued on the other side towards the S.S.W. for a few furlongs, so as to arrive at a small cocal, where we had the good fortune to fall in with some ripe bananas. My men, who had been fasting for two days and were almost exhausted, fell foul of the beautiful bunches of golden fruits, and were soon strong enough to resume the march.

We continued in a southward direction, passing a stream, and after walking a quarter of a league, fell in with another cocal and a habitation. This place was named Pucara, and nearly in its front was the River Puypullani. Continuing our march to the S.S.E., we came to the River Tunquimayo, so called because in its vicinity abounded the beautiful bird of an orange colour, known to the Indians as the Tunqui (*Rupicola peruviana*). We crossed this stream by a bridge formed of three boughs, and afterwards two others, descending a little afterwards, and arriving at the bridge over the Esquilaya.

The bridge of Esquilaya, being the work of Indians, deserves a brief notice. The river is here some 40 yards in width, and as there are no trees in the neighbourhood long enough to span it, the Indians have had recourse to a contrivance not wanting in originality. They have excavated on either side three deep oblique holes and inserted in them solid trunks of trees, which by the slanting position of the holes have an inclined position, so that the interval between the two sides of the river is considerably diminished. Three horizontal boughs have been laid on the extremities of these trunks, and upon this structure are bound other sticks transversely, like a ladder, but nearer to each other. These sticks are annually renewed, but the large pieces of trees used in the framework being more durable, have remained the same for about twenty years. The bridge of Esquilaya is 2298 feet above the level of the sea.

Crossing the bridge we ascended by a zigzag track in a direction to S.S.W. We crossed a large stream, called Churomayo, and continued ascending to the tambo of Esquilaya, distant from the bridge half a league. This tambo, or travellers' shed, takes the name of Esquilaya, because the bridge is considered the door of entry to the hot valleys below, where the coca is cultivated, and it is consequently the point of rendezvous for the Indians, who have their little plantations in the Esquilaya valley, and is much frequented at harvest time. At this tambo lives an

Alcalde, attended by another Indian, who acts as Alguazil, and carries out his orders. It is always an Indian who fills this post; but he does not understand one word of Spanish—his language being Quichua.

The tambo of Esquilaya is the only inhabited spot in the whole valley, and the other places being peopled only during the coca harvest, the people during the rest of the year all live in the town of Ayapata. The Indian owners of these small *cocales*, when they return for the season to Ayapata, leave their provisions, sheep-skins used as bedding, cooking-pots, working clothes, &c., tied up in bundles, to the Alcalde, who takes care of the property, hung to the thatch of his house, until the following year. It is not unusual to see more than a hundred of these bundles, each hanging by a cord from the rafters of the thatch; and it is curious that the Indians should, after many months, each know his own bundle, as they are all so much alike.

It is only a few years since that the Indians used to leave their working instruments, consisting of cutlasses, called ychuma and hatchets; but since 1859 they have ceased to do so, for on the 4th of May of that year the savage Indians came as far as the tambo of Esquilaya, killed the Alcalde, and took away 800 cutlasses and 300 hoes. It is not the first time that the Chunchos have attacked Esquilaya. When the bridge was being constructed they killed by arrows an Indian who was boring the rock.

The Chunchos are continually prowling about the valley, and lose no opportunity of being troublesome. My followers looked upon themselves as most fortunate in having made so considerable a journey in the Chuncho country without having fallen in with a party of them.

The principal cultivation in the valley of Esquilaya consists of coca and maize; still some little coffee, together with bananas, papaw-trees (*Carica papaya*, Linn.), guava (*Psidium pyriferum*, Linn.), and yuca (*Manihot aipi*, Pohl.) are planted.

The tambo of Esquilaya lies 4300 feet above the level of the sea, so that its climate is rather temperate, as will be seen by the table in the Appendix.

There is a road between the tambo of Esquilaya and the town of Ayapata, a distance of 11 leagues. We left on the 20th. The path does not lie along the ravine, on account of its being so closed in by rocks. Leaving the tambo there is a continuous ascent in a s.s.w. direction for nearly a league; then the course is s. and s.s.w. At a league and a half distance is the tambo of Chilleja; the road henceforward lies along a ridge which divides the River Ayapata from the Ecaco, the same stream which lower down is called the Quillabamba.

A league and a quarter above Chilleja is the small tambo of Crucero. As we ascended the latter, trees diminished in number and the vegetation became more uniform; half a league higher up, the greater portion of the trees belong to the genus Clusia, known in Carabaya as the Huaturo. On this road I noticed a new and small species of Chinchona, the flowers a red carmine, with much white down on the borders of the corolla. This species has some analogy with *Chinchona coccinea*, *erythrantha*, and *obovata* of Pavon.

Some four leagues from Esquilaya we came to the tambo of Ychucalla, where we passed the night. This spot is 10,600 feet above the level of the sea; nevertheless in its vicinity are seen several clusia-trees.

On the 21st we continued our march towards Ayapata, ascending towards the south for more than half a league, and then to the south-west for another quarter of a league to the tambo of Sachapata, which has two habitations.

The tambos between Esquilaya and Ayapata are visited by the Indians only when they go to and from the coca-plantations situated in the valleys of Esquilaya, Puypullani, and Quillabamba.

A few paces from Sachapata there is a small lake. The road is undulating until the most elevated portion of the road is attained, called the Apachecta of Compocosi, situated at 12,841 feet above the level of the sea.

Skirting the mountains we passed two other points of similar elevation—the Apachectas of Chincha and Chilunco. From the last we descended to the quebrada of Ayapata, but without reaching to the river; and we continued skirting this ravine a quarter of a league before we arrived at the town. We passed the River Yungamayo and then ascended to Ayapata, after a journey of fourteen days, in which we had undergone all sorts of difficulties and privations. We had, however, the satisfaction of having accomplished something towards elucidating the geography of this little-known region. We had proved that the rivers Ollachea and Ayapata enter directly into the River Inambari, without previously forming a junction with each other, or with the Marcapata of the forests of Cuzco, as it is erroneously laid down in many maps.

APPENDIX.

METEOROLOGICAL TABLES.

The wet-bulb observations were made with the thermometer covered by a thin cloth and kept wet. The barometric observations are corrected by temperature and the state of the weather.*

AT CRUCERO, Capital of the Province of CARAVAYA.

Day of Month.	Hour.	Thermometer in Air.	Wet Thermometer.	Barometer.	State of the Heavens.	Minimum Temperature at Night.
1864.		Fahr. °	Fahr. °	Inches.		
August 15	2·15 P.M.	51·62	39·56	18·353	Light large clouds ..	12°·20 F.
16	6·30 A.M.	23·90	32·0	18·465	Sun	
September 30	9 A.M.	45·86	42·44	18·396	Sun obscured.	
,,	11 A.M.	49·46	42·44	18·360	Cloudy.	
,,	1·30 P.M.	49·82	41·80	18·296	Sun.	
,,	3 P.M.	50·90	41·36	18·295	Ditto	27°·32 F.
October 1	8 A.M.	44·60	39·02	18·392	Ditto	
,,	9 A.M.	47·48	40·28	18·408	Ditto.	
,,	12 noon	50·90	41·36	18 380	Sun obscured	23° F.
2	9 A.M.	49·10	43·70	18·406	Sun	
,,	9·30 A.M.	49·10	41·36	18·000	Sun obscured.	
,,	10·30 A.M.	49·46	41·36	18·398	Cloudy.	
,,	12 noon	51·80	41·54	18·368	Sun obscured.	
,,	1·30 P.M.	53·96	42·62	18·445	Sun.	
,,	3 P.M.	50·54	41·54	18·334	Cloudy ..	26°·24 F.
3	9 A.M.	47·84	41·0	18·454	Ditto	
,,	10 A.M.	51·08	41·54	18·453	Sun much obscured.	
,,	11·30 A.M.	51·44	41·90	18·423	Ditto.	
,,	1 P.M.	51·44	42·26	18·392	Ditto.	
,,	2 P.M.	50·36	42·26	18·378	Sun variable.	
,,	3 P.M.	51·08	41·54	18·343	Cloudy.	
4	9 A.M.	46·50	39·20	18·454	Sun obscured	20°·30 F.
,,	10 A.M.	47·48	39·56	18·437	Ditto.	
,,	11 A.M.	51·26	40·10	18·415	Sun.	
,,	12 noon	53·42	38·30	18·380	Ditto.	
,,	1 P.M.	53·96	38·48	18·339	Ditto.	
,,	1·20 P.M.	55·04	38·48	18·326	Ditto.	
,,	2 P.M.	54·86	38·66	18·307	Ditto.	
,,	3 P.M.	53·24	39·56	18·297	Ditto.	
,,	6·30 P.M.	38·12	34·52	18·386	Clear	
29	9 A.M.	31·28	29·30	18·446	Cloudy ..	19°·22 F.

* The observations were made by a thermometer graduated to centigrades, and a barometer to millimetres; the results have been reduced to degrees of Fahrenheit and English inches by means of Guyot's tables.—ED.

CRUCERO—*continued.*

Day of Month.	Hour.	Thermometer in Air.	Wet Thermometer.	Barometer.	State of the Heavens.	Minimum Temperature at Night.
1864.		Fahr. °	Fahr. °	Inches.		
October 29	10 A.M.	33·80	29·30	18·470	Cloudy	
,,	11 A.M.	38·30	32·72	18·461	Ditto.	
,,	12 noon	42·08	37·40	18·440	Ditto.	
,,	1 P.M.	47·84	38·84	18·427	Sun much obscured.	
,,	2 P.M.	46·40	39·20	18·386	Ditto.	
,,	3 P.M.	46·76	40·10	18·376	Ditto.	
,,	4 P.M.	49·10	41·0	18·358	Sun.	
,,	5 P.M.	49·10	41·0	18·360	Ditto.	
,,	6 P.M.	45·50	41·0	18·337	Clear.	
,,	7 P.M.	44·78	41·0	18·364	Ditto.	

TOWN OF MACUSANI.

Day of Month.	Hour.	Thermometer in Air.	Wet Thermometer.	Barometer.	State of the Heavens.	Minimum Temperature at Night.
		Fahr. °	Fahr. °	Inches.		
August 17	2·45 P.M.	55·76	43·16	17·938	Sun	
,,	3·30 P.M.	52·52	42·62	17·934	Ditto	
,,	4·30 P.M.	50·54	41·36	17·935	Ditto	18°·50
18	8 A.M.	36·50	33·44	18·032	Ditto	
,,	9 A.M.	47·84	40·64	18·035	Ditto	
,,	16·30 A.M.	49·10	40·82	17·992	Scattered cumuli.	
,,	12 noon	51·44	41·36	17·963	Sun.	
,,	1 P.M.	50·72	40·64	17·942	Sun obscured.	
,,	2 P.M.	50·90	40·82	17·934	Cloudy.	
,,	3 P.M.	50·72	40·64	17·932	Sun obscured.	
,,	4 P.M.	47·66	39·56	17·925	Sun.	
,,	5·30 P.M.	42·08	35·60	17·952	Cloudy.	
,,	6·30 P.M.	40·10	35·24	17·974	Ditto.	
,,	10·30 P.M.	32·0	29·84	17·986	Moon; clear.	
,,	11·30 P.M.	27·50	29·84	17·979	Ditto do.	
19	7·30 P.M.	25·88	29·48	17·916	Sun obscured	19°·40

TOWN OF AYAPATA.

Day of Month.	Hour.	Thermometer in Air.	Wet Thermometer.	Barometer.	State of the Heavens.	Minimum Temperature at Night.
		Fahr. °	Fahr. °	Inches.		
August 27	2·30 P.M.	46·76	46·04	19·876	Rain.	
,,	3 P.M.	46·04	45·50	19·854	Ditto.	
,,	4 P.M.	45·68	44·96	19·832	Cloudy.	
,,	6 P.M.	43·70	43·52	19·857	Ditto.	
28	8 A.M.	41·54	40·82	19·909	Ditto.	

TOWN OF AYAPATA—*continued.*

Day of Month.	Hour.	Thermometer in Air.	Wet Thermometer.	Barometer.	State of the Heavens.	Minimum Temperature at Night.
1864-		Fahr. °	Fahr. °	Inches.		
August 28	10 A.M.	49·28	45·86	19·907	Sun.	
,,	12 noon	48·56	46·04	19·872	Sun; scattered cumuli.	
,,	2·30 P.M.	47·48	45·68	19·828	Cloudy.	
29	9 A.M.	46·58	45·14	19·874	Much cumulus; variable.	
September 22	5·30 P.M.	42·08	41·36	19·886	Cloudy.	
,,	6 P.M.	42·26	41·72	19·890	Ditto.	
,,	7 P.M.	43·88	43·52	19·895	Serene.	
,,	8 P.M.	44·06	42·26	19·900	Ditto.	
,,	9 P.M.	44·24	42·26	19·907	Some scattered cumuli.	
,,	10 P.M.	44·60	42·26	19·913	Ditto.	
,,	12 noon	43·52	43·34	19·918	Serene.	
23	8 A.M.	47·84	44·42	19·913	Cloudy; sun much covered.	
,,	9 A.M.	49·10	46·76	19·866	Sun covered.	
,,	12 noon	49·10	48·02	19·885	Cloudy.	
,,	1 P.M.	46·40	45·50	19·874	Rain.	
,,	2 P.M.	46·40	45·68	19·854	Ditto.	
,,	3 P.M.	47·12	46·76	19·853	Cloudy.	
,,	5 P.M.	45·50	45·50	19·863	Rain.	
,,	7 P.M.	45·50	45·32	19·913	Cumulus scattered.	
,,	10 P.M.	44·24	44·06	19·963	Ditto.	
24	8 A.M.	46·40	43·52	19·942	Ditto.	
,,	9 A.M.	48·02	44·78	19·946	Sun clouded.	
,,	11 A.M.	50·54	46·76	19·917	Sun.	

OLLACHEA.

Day of Month.	Hour.	Thermometer in Air.	Wet Thermometer.	Barometer.	State of the Heavens.	Minimum Temperature at Night.
		Fahr. °	Fahr. °	Inches.		
August 20	6·40 P.M.	52·52	44·78	21·717	Cloudy ..	41°·72 F.
21	7·30 A.M.	49·64	46·04	21·816	Sun	
26	3·20 P.M.	50·36	50·36	21·780	Cloudy ..	41°·36 F.
,,	4·30 P.M.	49·64	48·92	21·761	Ditto	
27	7 A.M.	46·40	44·78	21·803	Serene.	

CORANI, 25*th August*, 7·5 A.M.

	°
Thermometer in air	35·24
,, wet	35·24
Barometer at 32	18·638

Variable weather.

Tambo de Tatanara, 1*st September*, 7·30 A.M.

Thermometer free in air	54°·14
„ wet	53·96
Barometer	23·233
Variable.	

Tambo of Pacanusi, 2*nd September*, 9·30 A.M.

Thermometer in air	64°·60
„ wet	62·96
Barometer	27·380
Sun.	

Meteorological Observations made at the Hacienda of S. José de Bellavista, in the Valley of San Gavan.

Day of Month.	Hour.	Thermometer in Air.	Wet Thermometer.	Barometer.	State of the Heavens.	Minimum Temperature at Night.
1864.		Fahr. °	Fahr. °	Inches.		
September 2	2·30 P.M.	74·12	73·94	27·560	Sun	65°·48
,,	5·30 P.M.	72·50	69·62	27·533	Cloudy ..	
3	6·30 A.M.	64·04	64·04	27·576	Ditto.	
,,	7·30 A.M.	65·12	65·12	27·595	Ditto.	
,,	8 A.M.	66·56	65·48	27·599	Sun, and scattered clouds.	
,,	9 A.M.	70·16	69·08	27·616	Sun.	
,,	9·30 A.M.	73·94	69·44	27·628	Ditto.	
,,	10·30 A.M.	77·72	71·60	27·617	Ditto.	
,,	11·30 A.M.	79·34	71·60	27·599	Ditto.	
,,	12 noon	80·78	72·86	27·592	Ditto.	
,,	1 P.M.	79·70	72·32	27·575	Much cumulus.	
,,	2 P.M.	78·44	71·60	27·560	Clouded.	
,,	3 P.M.	79·16	71·60	27·577	Ditto.	
,,	4 P.M.	77·72	71·60	27·530	Sun; much cumulus.	
,,	5 P.M.	75·56	74·66	27·536	Clouded.	
,,	6 P.M.	74·84	73·94	27·542	Rain.	
,,	7·30 P.M.	72·32	71·60	27·549	Sun obscured	
4	8 A.M.	70·16	68·72	27·615	Sun much obscured ..	64°·04
,,	9 A.M.	73·94	69·26	27·629	Ditto.	
,,	10 A.M.	76·64	72·68	27·616	Clouded.	
,,	11 A.M.	77·72	75·20	27·593	Ditto.	
,,	12 noon	79·70	77·18	27·568	Ditto.	
,,	1 P.M.	74·12	71·78	27·563	Rain threatens	
,,	4 P.M.	76·82	74·66	27·536	Slight rain ..	
5	11 A.M.	80·42	73·40	27·576	Clouded ..	64°·40
,,	12 noon	81·14	75·20	27·569	Sun.	
,,	1·15 P.M.	74·46	69·80	27·552	Tempest threatens; sky grey; thunder.	
,,	2·30 P.M.	72·50	70·52	27·549	Clouded; rain.	
,,	4 P.M.	72·32	70·16	27·517	Rain	
,,	7 P.M.	70·70	69·08	27·516	Clouded ..	64°·76
6	11 A.M.	74·48	71·78	27·577	Ditto.	
,,	4 P.M.	75·56	72·50	27·467	Ditto.	
,,	5 P.M.	75·02	71·60	27·471	Sun.	

During the night from the 4th to the 5th it rained continually, and nearly up to daybreak.

September 8, PLAYA OR SHORE OF THE RIVER SAN GAVAN, 6 A.M.

Thermometer in air	60°·80
,, damp	59·54
Barometer	27·930

Cloudy weather.

September 9, SHORES OF THE RIVER SAN GAVAN, 6·30 A.M.

Thermometer in air	61°·70
,, wet	60·44
Barometer	28·052

Cloudy weather.

September 10, SHORES OF THE RIVER SAN GAVAN, 9 A.M.

Thermometer in air	65°·84
,, wet	64·40
Barometer	28·327

Sun obscured.

THE following METEOROLOGICAL OBSERVATIONS were made at the junction of the SAN GAVAN with the INAMBARI.

Day of Month.	Hour.	Thermometer in Air.	Wet Thermometer.	Barometer.	State of the Heavens.	Minimum Temperature at Night.
1864.		Fahr. °	Fahr. °	Inches.		
eptember 11	11 A.M.	79·16	69·62	28·497	Sun.	
,,	12 noon	78·80		28·465	Ditto.	
,,	1 P.M.	78·44	70·16	28·418	Sun and cloudy.	
,,	2 P.M.	78·80	69·26	28·378	Ditto.	
,,	3 P.M.	79·16	68·36	28·347	Ditto.	
,,	4 P.M.	77·72	71·0	28·343	Ditto.	
,,	5 P.M.	73·76	69·80	28·347	Ditto.	
,,	6 P.M.	71·78	67·64	28·390	Ditto	60°·44 F.
,,	7 P.M.	68·0	66·92	28·390	Clear	
,,	8 P.M.	66·20	65·84	28·418	Ditto.	
12	5·45 A.M.	60·80	60·80	28·414	Mist, rather dense.	
,,	6·30 A.M.	60·80	61·16	28·438	Sun; mist clears off.	
,,	7·30 A.M.	64·40	65·12	28·457	Sun.	
,,	8 A.M.	71·24	68·36	28·465	Ditto.	

SHORES OF THE INAMBARI, 12*th September*, 8 A.M.

Thermometer in air	64°·76
,, wet	63·68
Barometer	28·347

SHORES OF THE INAMBARI, 13*th September*, 4·30 P.M.

Thermometer in air	70°·16
,, wet	67·64
Barometer	28·170

Threatening rain.

14*th*, 10·30 A.M.

Thermometer in air	65·48
,, wet	65·12
Barometer	28·229

Cloudy.

Beach on the River Esquilaya, 15*th September*, 6·45 A.M.

Thermometer in air	62°·60
,, wet	61·16
Barometer	28·032

Sun shining.

La Hacienda, 17*th September*, 7 A.M.

Thermometer in air	63°·50
,, wet	62·60
Barometer	27·520

Meteorological Observations made at the Tambo of Esquilaya.

Day of Month.	Hour.	Thermometer in Air.	Wet Thermometer.	Barometer.	State of the Heavens.	Minimum Temperature at Night.
1864.		Fahr. °	Fahr. °	Inches.		
September 18	7 A.M.	64·76	64·40	25·886	Rain.	
,,	8 A.M.	64·40	62·60	25·888	Cloudy.	
,,	9 A.M.	66·20	64·58	25·890	Ditto.	
,,	10 A.M.	69·62	67·82	25·900	Ditto.	
,,	11 A.M.	70·34	65·66	25·877	Ditto.	
,,	12 noon	71·96	69·44	25·809	Sun.	
,,	1 P.M.	73·58	68·36	25·784	Ditto.	
,,	2 P.M.	74·12	65·84	25·768	Ditto.	
,,	3 P.M.	72·86	66·02	25·792	Sun much covered.	
,,	4 P.M.	72·86	65·84	25·788	Ditto.	
,,	5 P.M.	69 44	65·48	25·788	Sun sinking.	
,,	6 P.M.	68·36	65·12	25 797	Clear.	
,,	7 P.M.	67·28	65·30	25·781	Ditto.	
,,	8 P.M.	67·10	64·40	25·783	Ditto	
,,	9 P.M.	66·20	64·04	25·824	Ditto	61°·16
,,	10 P.M.	66·20	64·58	25·873	Cloudy ..	
19	7 A.M.	62·96	62·06	25·867	Rain.	
,,	8 A.M.	63·50	62·42	25·873	Ditto.	
,,	9 A.M.	62·78	62·24	25·923	Ditto.	
,,	10 A.M.	63·68	62·78	25·914	Ditto.	
,,	11 A.M.	65·12	64·40	25·910	Rain ceases.	
,,	12 noon	66·92	66·38	25·906	Sunshine.	
,,	1 P.M.	64·22	63·68	25·848	Cloudy.	
,,	2 P.M.	62·78	62·42	25·833	Rain.	
,,	3 P.M.	62·96	62·24	25·809	Cloudy.	
,,	4 P.M.	62·42	61·52	25·810	Ditto.	
,,	5 P.M.	62·06	61·34	25·815	Ditto.	
,,	6 P.M.	..	59·72	25·826	Ditto	
20	7 P.M.	60·44	59·54	25 832	Ditto	59°
,,	7 A.M.	61·88	61·88	25·848	Sun obscured	
,,	8 A M.	61·88	63·50	25·856	Ditto.	
,,	9 A.M.	65·84	64·22	25·852	Sun.	
,,	10 A.M.	69·08	65 84	25·849	Ditto.	

VII.—*The Delta and Mouths of the Amu-Daria, or Oxus.* By Admiral A. BOUTAKOFF, of the Russian Navy. Translated from the Russian, and communicated by JOHN MICHELL, Esq., H.B.M. Vice-Consul at St. Petersburg.

Read, March 11, 1867.

THE Amu-Daria, or Oxus of the ancients, after flowing in one main channel through the greater part of the Khanat of Khiva, first begins to bifurcate in about lat. 42° 12′ and long. 60° 15′ of Greenwich, between the towns of Kipchak and Khodjaili, after which it divides into the several branches which form its delta. The centre part of this portion of the basin forms a sort of depression, into which the waters of all the branches, excepting the westernmost, empty themselves, in a series of lakes, overgrown more or less with reeds; out of these they again flow off in separate channels, discharging themselves into the sea of Aral.

The Delta of the Amu-Daria lies between the two main branches of the river—the Laudan, which strikes off to the west, and the Kuvan-Djarma, or Kuk, which branches off somewhat below the town of Khodjaili on the east; the latter, above the point where it falls into the sea, is known by the name of "Yangy-su."

The course of the Laudan, as well as the middle portion of Aibugir Lake, which is overgrown with reeds, and through which the Laudan flows, have not as yet been explored. I examined the mouth of the Laudan in 1848-9, and in 1858, and found a depth of $1\frac{1}{4}$ to $1\frac{1}{2}$ foot, across the bar, with a very feeble current. The bottom on the bar was so firmly overgrown with reeds, that I saw a caravan of 1500 camels, proceeding to Russia, ford it with ease. In order to keep off and control the Yamud Turkmen, who roamed along the course of the Laudan and around Lake Aibugir, and who preyed on the inhabitants of the western borders of the Khanat, the Khivans dammed the upper portion of the Laudan, and erected the small fortress of Bent in its defence. The Turkmen, taking advantage of the frequent commotions in Khiva, on several occasions destroyed the dam, which had been constructed with the object of depriving them of water; but the Khivans each time repaired it as well as they could. The Laudan is principally supplied with water from the overflowing of the Amu-Daria.

The eastern arm which limits the delta flows off to the right, as already stated, below the town of Khodjaili, and is called the Kuvan-Djarma, or Kuk (Blue). It runs in a northerly and north-easterly direction, fills the lakes Dau-karā and Tampyné-Ayagé, and then, under the name of Yangy-su falls into the Tushé-bas bight of the Aral, opposite Ermoloff Island.

Map of the DELTA & MOUTHS of the AMU-DARIA,

from a Sketch Map by

Admiral A. Boutakoff

(Russian Navy)

SEA OF ARAL

LAKE AIBUGIR

Tokmak Atyr Iq.

Urgu Muran Pt.

Kich-kené Daria

Tchka settlement

Kimu

Ft. Mulla Hamysk (Karakaya paskaya)

Ferrier Off I.

Tuské Bas

Good anchorage

Tuldyk

Ulkun Daria

Kazak Daria Watercourse

Fort Chimbai

Transverse stone ridge at 34 Versts distance from the Sea

Vanguy Su R.

Airtim Kul Lake

Mt. Kushkanat Tau

Kubé-Tau Mt.

R. Kuldun

Tampyné-Ayagé L.

Dau Karâ L.

KUNGRAD

Ft. Kurganchè

Chutchka-Bas Mt.

Burly Mt.

Kara Baili R.

R. Kuk (Kuvan Diarma)

This arm is considered navigable by the Kirghizes

Kak Daria Current

Kiat Yargan

Ruins of Ft. Old Nukus

Ft. New Nukus

Amu Daria R.

R. Kechety

Mt. Itkyk-Tau

River Laudan

KHODJAILI 27 Versts from Khiva according to Danilevsk

Ft. Kanzly

Destroyed Dam

Mt. Bish-Tiubia

Ft. Bent

Dam

Mt. Chalpak

KUNIA URGENDJ

Sarkrauk Watercourse

KIPCHAK

English Miles 5 10 15 20 25 30

Russian Versts 10 20 30 40 50

Geographical Miles 5 10 20 30

Soundings in fathoms

59 60

43

Published for the Journal of the Royal Geographical Society by J. Murray, Albemarle Street, London, 1867.

Edwd. Weller

The appellation of Yangy-Su, or Yangy-Daria (New Water or New River), pronounced by the Kirghiz "Djangy-Sú" or "Djangy-Daria," has given rise to a general confusion of the Djangy-Daria—branching off from the Amu—with the Djan-Daria, which is thrown off by the Syr (or Jaxartes) below Fort Perovski, and loses itself in the sands; there being nothing in common between these two rivers.

In 1848 and 1849 the principal mass of the waters of the Amu-Daria was discharged through this branch into the sea, so that close to Ermoloff Island, 9⅓ miles from the mouth of the Yangy-Su, we drew fresh water from over the side of the vessel. In 1859 the water in the whole of the Tushé-bas bight, which had shallowed, was perfectly salt. The reason of this in all probability was, that during this decennial period the mass of water had found vent in another direction.

I ascended the Yangy-Su and its prolongation the Kuk in 1859 as far as Lake Tampyné-Ayagé, which is situated opposite Lake Dau-Karà, and is separated from it by a narrow and depressed spit, over which at high-water flood the water reaches into the Dau-Karà. These lakes communicate with each other also by a small stream, about 20 fathoms broad. Before falling into the sea the Yangy-Su forms its own delta, and flows past several small hillocky islets called "Bish-Kum." The breadth of the Yangy-Su is from 40 to 70 fathoms, with a depth of 5, 7, and 8 feet; its banks consist mostly of sandy hillocks, overgrown with the "Saxaul," and on firmer ground by the "Djida" (*Satarix*), the berries of which are collected in the autumn by the Khirgizes and Karakalpaks. Cultivated fields and melon-grounds occur occasionally by the river-side. The current of the river is very weak, about one-half and three-quarters of a knot per hour; it rarely attains 1½ knot per hour.

After ascending the Yangy-Su, 22⅔ miles, my farther progress was arrested by the Yangy-sunyng-tashé, a rocky ridge extending right across the bed; the depth of water over it was 1½, 2, and 2¼ feet, and only in one place was there a narrow channel with 2½ feet; the rocks consisted of a grey sandstone. In consequence of this barrier I was compelled to leave behind me my principal vessel, a steamer of 40-horse-power, whose draught did not allow her to pass the ridge, and to continue the survey in an open 12-horse-power steamer, with a crew of eighteen men. The stony bottom, with sharp rocks here and there rising nearly to the surface of the water, extends for about 8 miles from the ridge. By constant soundings I found that, immediately after depths of 7, 8, and 9 feet, there were depths of 3 feet and less, and that the steamer rasped the rocks, first on one side and then on the other, after which soundings of 7 and

8 feet were again obtained. The banks here on both sides rose to from 40 to 60 feet, steep, and consisting of clay, being covered with bushes, affording capital ambush. As we arrived here unexpectedly we met no one, but if the Choudur Turkmen located around the Khivan fortress of Kurganché, erected higher up on the Kuk, had been informed of our approach, three or four of them, stationed in the bushes, might easily have shot down the whole of my party without incurring any danger themselves. Above this point this branch is called the "Kuk" (blue), and flows between sandy hillocks overgrown with saxaul. In some places it washes round very low islands, and in others it throws off small lakes by its sides. Its breadth is from 50 to 80 fathoms, and depth, 5, 6, 7, and 8 feet. Beyond the reed-covered lake of Tampyné-Ayagé is Chutchka-Bas Mountain, on the eastern slope of which is situated the Khivan fortress of Kurganché, which dominates and keeps in subjection the Kirghizes and Karakalpaks, who nomadize or are settled in those parts and around Lake Daù-Kara.

Lake Tampyné-Ayagé and the farther course of the Kuk were not surveyed by me, inasmuch as during my expedition, which was in September, the water had considerably subsided; besides it would have been the extreme of rashness on my part to have penetrated into the heart of a hostile country with eighteen men, having a Khivan fortress in my rear, and knowing, as I did, that the signal of alarm had been sounded throughout the whole country in consequence of my sudden appearance at Nukùs Fort, the particulars of which will be given further on.

After throwing off the Kuvan-Djarma or Kuk, the Amu-Daria flows to the north-west and north; its waters, however, are continually drained into a number of small streams striking off to the right, and particularly into a bigger one, the Karabaili, which spreads out over the depressions, forming reed-covered lakes, out of which the water then runs off into the one common channel of the Ulkun-Daria (Great River)—the branch containing the largest amount of water of all the branches by which the Amu-Daria discharges itself into the Sea of Aral.

Only one part of the Amu—namely, that called the Taldyk, below the town of Kungrad, and which separates into several small streams before falling into the sea—reaches the Aral without having its course interrupted by lakes. The Taldyk, from the western side, is the second of the mouths of the Amu. In 1848 and 1849 it had a very rapid current, and a depth of 3 feet on the bar; in 1858 I found that its drift had been brought about $1\frac{1}{3}$ mile lower down, and that there was only $1\frac{1}{4}$ to $1\frac{1}{2}$ foot of water on the bar; the bottom had also become so soft and oozy that it was with difficulty that we drew our feet out of it.

Along the banks of the Taldyk there are many fine meadows, and many cultivated fields and melon-grounds.

The fortified town of Kungrad, the principal bazaar and centre of administration of the province of Kungrad, is situated on the left bank of the Amu-Daria. Its population numbers from 6000 to 8000, and consists of Uzbegs, Sarts, Kirghizes, and Karakalpaks. Besides the so-called Khan's Palace, with its fine garden, occupied by the governor of the province, the principal mosque and large caravanserai, all built of lumps of clay, there are no remarkable buildings; the houses of the inhabitants are mean-looking, the streets narrow, crooked, and dirty, and malodorous. Around the town spread fields, gardens, and melon-grounds, all of which are artificially irrigated.

My first examination of the Taldyk mouth was in 1848. In order quicker to ascertain which of the passages was navigable, we forded the greater part of them during the day, in which work no one molested us; but two days after, when we examined the remaining channels, we were closely watched by 50 Khivan horsemen, who had been sent by the Khan to seize me, dead or alive. They rode along the bank off which I was taking soundings from a boat; and although we were only five they did not dare to attack us, but tried to allure us on shore. We conversed together very amicably. I told them we were fishermen and wished to trade with them: on their part they invited me to land, offering me rice, fruit, &c., for sale. Perceiving, however, that having accomplished our object we were retiring, they grew furious, and, dismounting, waded into the water after us with their guns. But it was too late—we were already quite out of reach: all they could do was to send a volley of abuse after us, to which my sailors humorously responded. Some Kirghizes, who had shifted their encampments to the Syr-Daria, subsequently gave me the following somewhat original account which they had heard from the Kara-kalpaks of my appearance at the mouth of the Taldyk:—

"At daylight a high white mountain appeared at sea, the summit of which spoke with the skies: this mountain continued to approach the shore, it then suddenly stopped and dived under water (I lowered sail and came to anchor). Instead of the mountain there appeared a large boat: this large boat soon gave birth to a little boat, in which a Russian "turia" (commander) rode backwards and forwards on the river, poking black poles into the water. (I took the depth of the water with a black measure, on the side facing the sea.) When the boat had disappeared, the 'batyrs' or horsemen sent by the Khan strictly ordered the Karakalpaks to pull out these black poles so that they might be sent

to Khiva, but, in spite of their diligent search, they found nothing; seemingly they must have been betwitched."

The fame of my supernatural power extricated me more than once from positions of very great danger. Thus, in 1859, I found myself with my steamer in the Ulkun-Daria, in the very centre of the whole Khivan army, commanded in person by the Khan, and unluckily whilst proceeding up this river I got aground.

The Khivans numbered 10,000 men, and had 10 brass guns which had been cast and moulded by a runaway Russian artillery-man. I was ready to repel any attack, but refrained from firing the first shot. The Khivans, who rode up and down in front of my steamer for more than three hours, and who had commenced to unlimber their guns on a spit of land facing us, suddenly limbered up again and withdrew with their guns to their chief camp. After this about 400 mounted Turkmen, mostly armed with double-barrelled English guns, paraded before me: these were followed by a body of about 300 barefooted infantry soldiers in red jackets, armed half of them with matchlocks and the other half with pikes. A big Turkish drum was carried at the head of the detachment. In this way the obstacles to my farther ascent of the river were removed by themselves. I afterwards ascertained that at the military council of the Khan, who was in favour of opening fire upon us, one of the chief Uzbegs said:—

"What is the good of firing at the Russians, who are doing us no harm? Suppose we do even kill and wound several of them, what will be the good of it? The 'Ut-kayuk' (fireboat) of these infidels is of iron, which with them is made even to float, and our shot will consequently fly off (the sides of our vessel were only one-eighth of an inch thick). It is not those guns which we see that are dangerous, but those black holes out of which they will fire such infernal things to destroy us all." These terrible holes were only the apertures in the cabins.

The Ulkun-Daria, which discharges the greater portion of the waters of the Syr-Daria into the sea of Aral, falls into the latter by two branches. The western one is called the Kitch-kené-Daria. The point of bifurcation of the two branches is at Tenké-Kumu settlement, about $6\frac{2}{3}$ miles in a straight line from the sea.

The Ulkun-Daria takes its rise in the reedy lake of Airtin-Kul, which is fed at its upper end, and out of which is discharged in a stream, 15 fathoms broad and 4 fathoms deep, the principal mass of waters of the lake. This stream further on branches off at a sharp angle into two parts, forming on the right the Ulkun-Daria, and on the left the narrow watercourse of the Kuldun, which flows for a distance of about 27 miles and

then falls into the Taldyk a little below Kungrad. In 1858 the greatest depth of the Kuldun was 4½ feet, while in 1859 there were only 2½ feet at full water, and it was being overgrown with reeds; the body of water by which it had been fed was diverted into the Ulkun-Daria.

The Ulkun-Daria is fed by affluents, which increase in size in proportion to the extent of its course and issue out of the well-supplied lakes above. Thus 2 miles below its source, at Meneken-Bagé village, its breadth is already about 80 fathoms, with depths of 4, 5, and 6 feet, whilst 20 miles lower down its breadth is from 120 to 180 fathoms, with depths of from 3, 4, and 5 fathoms. The height of Kubé-Tau Mountain, opposite to which the Ulkun-Daria makes considerable bends, is about 80 feet. On its eastern slope is a cemetery, full of strange tombs and monuments in the shape of cupolas, square towers, &c.

The mass of water of the Ulkun-Daria continues to increase from the right by the inpouring of large streams flowing from lakes. These streams bear the common name of Kuk-Uziaks, and are from 15 to 25 fathoms broad and from 6 to 7 fathoms deep. The banks of the river above Kubé-Tau Mountain, opposite the Kuk-Uziaks and below them, are covered with gardens and cultivated fields, particularly the left bank. The river is also bordered by many houses, surrounded by willow, apricot, and tall poplar trees. The inhabitants are nomadic, being composed of Sarts, Uzbegs, and Karakalpaks. A dam extends along the edge of the depressed bank, which retains the water during the floods and enables the natives to irrigate their fields and gardens at all seasons of the year.

The body of water in the Ulkun-Daria does not decrease over its course of 47 miles to the point where it throws off the Kazak-Daria, on which stands the small fortress of Chimbai. Its banks are thickly overgrown with the "djida," willows and prickly shrubs, and become flooded at high water; the thick brushwood is frequented by wild boars, tigers, and jackals. The breadth of the river is from 150 to 200 fathoms, and the depth in some places reached 7 fathoms; the current was from 3 to 3½ knots, or nearly 6 versts per hour.

Below the Kazak-Daria the banks are again drier and firmer; large fields, with meadows intervening, occasionally border the stream. The population here consists principally of Karakalpaks; there are also a few Kirghizes.

In 1859, when the whole region was panic-stricken by the depredations of the Turkmen, who had dispossessed the Khan of Khiva of Kungrad, the Karakalpaks erected several quadrangular earthworks in which they crowded their tents. The

largest fortified encampment of this kind, consisting of 1000 "kibitkas," or tents, was at Tenké-Kumu point.

The soil along the lower course of the Ulkun-Daria is saline-argillaceous. Fields border the banks of the river, and herds of cattle were seen in the country beyond. The Karakalpaks, who are principally employed in agriculture and only rear sufficient cattle for their absolute wants, appeared to be in a prosperous condition: the Kirghizes, however, were generally very poor. The number of the latter decreases annually, owing to their emigration to Russian territory along the line of the Syr-Daria.

In 1859 I passed out of the Ulkun-Daria, through the lower Kuk-Uziak and the lake and stream of Karabaili into the chief course of the Amu-Daria.

The lower Kuk-Uziak at its fall into the Ulkun-Daria is about 30 fathoms broad and 7 fathoms deep at the full-water season. After ascending it for $2\frac{1}{2}$ versts I found that it consisted of the junction of two branches: the source of the right is lost in the reeds, but through the left, notwithstanding its narrowness and sinuosity, I succeeded in entering Lake Kara-Kul. It cost me great trouble to advance through the dense masses of reeds which grow over depths of 6 and 7 feet: at one part it took me a whole day to steam a distance of $2\frac{1}{2}$ versts.

The saxaul shrub grows very plentifully at Kushkanat-Tau hill, the elevation of which is about 150 feet. Beyond it my course lay partly through compact masses of reeds and partly through the open waters of lakes Ak-Kul and Mamet-Kul, in which I encountered many shallows and firm islets: in some places the limpidity of the water enabled me to see submerged fields and artificial water-courses, which proved that these parts had formerly been cultivated and subsequently become submerged in consequence of the rupture of the dams, or owing to a change in the course of the river. The channels were frequently narrow, winding, and shallow—sometimes less than 4 feet, though this was at the end of August, when the waters generally subside to a considerable extent.

When in sight of Burly Hill, an elevation of about 40 feet, covered with numerous tombs, I determined to leave my principal surveying force behind me, and to proceed forward in a small steamer of 12-horse-power, in which I penetrated through the reeds into the Karabaili channel, and from thence into the main stream of the Amu-Daria.

The Karabaili branches off from the Amu-Daria on the east, at about $43\frac{1}{3}$ miles below the town of Khodjaili, and then unites with it again within about 20 miles below Kungrad. The portion I passed through was lined with firm banks, which, how-

ever, become submerged during the floods. Its breadth varies from 20 to 40 fathoms, with depths at a period of low water from 3, 4, 5, to 7 feet. On both banks there are fields, gardens, and melon-grounds, and apricot and poplar trees grow along the margins.

After passing the ruins of the deserted town of Old Nukus-Bazar, and proceeding $3\frac{2}{3}$ miles beyond it, we suddenly, on coming round the bend of the river, saw before us the newly erected fortress of New Nukus, with crenelated wall $3\frac{1}{2}$ fathoms, having faces about 200 fathoms in length. This unexpected sight rather surprised us, and made us come to a dead stop; finding, however, that, on more careful examination, there were no guns mounted on the walls, we started forward again at full speed. This occurred at eight o'clock in the morning, on a bazar day; the banks were crowded with people, and a shoal of boats filled with vegetables, firewood, melons, bags of millet, &c., stood moored in the river, opposite the fortress. The appearance of my little steamer was to the Khivans an astounding surprise, and they gazed on the strange phenomenon in mute astonishment. As I was passing the fortress, an officer hurried out to the river-bank with an invitation that I should pay the Bek, or commandant, a visit. I replied that I was proceeding to Khodjaili; but that on my way back I would certainly pay a visit to the Bek, of whose wisdom and great virtues I had heard so much. We advanced at the same time slowly forward, our progress being occasionally impeded by shoals on which we ran aground. After passing about $9\frac{1}{3}$ miles, we reached the commencement of the Karabaili, where it branches off from the Amu-Daria. I here stopped the engines in order to make a mid-day observation of the sun for latitude, then entering the main stream of the Amu-Daria, I hoisted the Russian colours, and steamed from one side of the river to the other.

At this point the breadth of the river, which is considerably lessened by the separation higher up of the Kuk branch, and of several small streams on the right, is about 200 fathoms; the depth, notwithstanding the considerable fall in the level of the water, was from 5 to 7 feet, and the current about $2\frac{1}{2}$ knots ($3\frac{1}{2}$ versts) per hour. The banks are low; the right bank is covered with the willow and "djida," and the left with reeds. No inhabitants were to be seen.

Having in our rear a Khivan fortress, the garrison of which it was to be expected would soon recover from the panic caused by our appearance, I did not consider it advisable to tarry long in these waters; so, after making an observation of the altitude of the sun for longitude, we got up full steam, and sped rapidly

down the river with the current. The horseman, who had easily followed us when we were feeling our way up-stream, was now obliged to gallop hard; but the uneven country and the numerous canals checked his progress, and he lagged far behind, so that he reached the gate of the fort when we had already long passed it, and when it was too late to adopt any measures for arresting our progress. A Khivan officer, in a high sheep-skin hat and bright silk robe, galloped after us on a horse which he had hurriedly mounted without a saddle (evidently we had not been expected to return so soon), and shouted to us that the Bek expected us to visit him, that he had prepared an excellent repast, that we ought not to disappoint him, and so forth. I continued my course, however, without stopping, and answering the officer that I was sorry not to be able to visit the Bek on that occasion, sent him my compliments, wished him good health and much happiness, and soon disappeared. We only saw at a distance that the horse of the Khivan envoy came to a dead stop at a broad ditch full of water, and how the rider tore off his hat from his head in despair, and dashed it to the ground.

The depth of the bar of the Ulkun-Daria is subject to constant change; crossing it in July of the year 1859, I found only $2\frac{1}{2}$ feet of water, and was obliged to unload my steamer entirely, and to send out men with spades to dig out a channel, through which we advanced inch by inch. In August and September, however, of the same year there were 4 and $4\frac{1}{2}$ feet on the bar, and I easily steamed over it.

Besides the four principal mouths of the Amu-Daria, viz., the Aibugir, Taldyk, Ulkun-Daria, and Yangy-Su, there are several other intermediate embouchures which open into the sea, but these are all very small, shallow, and are covered with reeds.

VIII.—*On Part of Mesopotamia contained between Sheriat-el-Beytha, on the Tigris, and Tel Ibrahim.* By Lieutenant J. B. BEWSHER, Surveyor in Mesopotamia.

Read, April 8, 1867.

THE sheet of the survey of Mesopotamia, which has just been completed, extends from Sheriat-el-Beytha, on the Tigris, 10 miles north-west of Baghdad, to the large mound of Tel Ibrahim, nearly in the centre of the Jezireh (or Mesopotamia), and 19 miles N.N.E. of Hillah. This is the northern point in the sheet completed by Lieutenant Collingwood.

The work was taken up by Commander Selby and myself in

Trigonometrical Survey of a part of

MESOPOTAMIA

FROM SHERIAT EL BEYTHA

(on the Tigris)

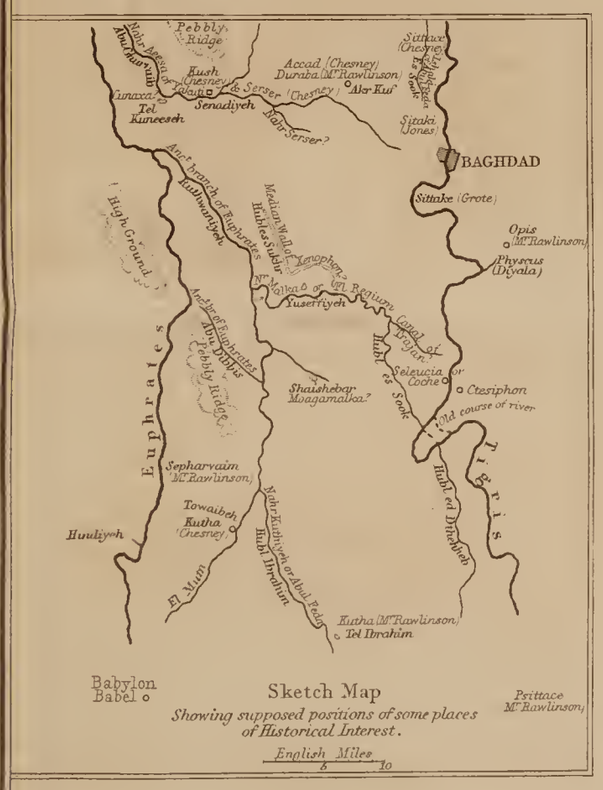
TO TEL IBRAHIM

to accompany the Paper by

Lieut. J. B. Bewsher

Scale of 10 English Miles

1 2 3 4 5 6 7 8 9 10



Sketch Map

Showing supposed positions of some places of Historical Interest.

English Miles 0 10

Reference.

- *Ancient supposed navigable canals*
- *Unused irrigants or branch canals*
- *Canals in actual use*
- *Ruins converted by time into Tels or mounds*

Edw.d Weller.

Published for the Journal of the Royal Geographical Society by J. Murray, Albemarle Street, London, 1867.

the autumn of 1862. Several things occurred to prevent the completion of the sheet till the autumn of 1865. In the first place, the Montafik rebellion rendered the country unsafe for a time. As soon as this affair was settled, my services were required by the Political Agent in connexion with the telegraph then being erected between Baghdad and Busreh. When I was again able to go on with the survey, Commander Selby had retired, and I had succeeded him as surveyor in Mesopotamia. In attempting to give a brief description of the country contained in this sheet, I purpose following down, as far as possible, the course of the old navigable canals which can still be traced. I shall confine myself almost entirely to a description of the ancient streams, canals, and ruins; for the present appearance of the country offers a sad contrast to the Mesopotamia of Greek and Roman authors, or even to the Jezireh of the time of the Abbasside Khalifs of Baghdad. Little need be said of the few modern canals and scant cultivation of the present day.

In the north-east corner of this sheet, and less than a mile and a half from the Tigris, is the bed of an old stream, now called Es Sook, or the Bazaar. It runs down towards Baghdad, the environs of which city it formerly supplied with water. It appears to have been regularly built, as ruins run along both banks till within a mile and a half of the town (or suburb of Baghdad) called Kathemain. It is supposed by Chesney to be identical with the Ishaki canal, dug, according to Abul Feda, in the time of the Khalif Muta Wakkel (A.D. 850) by Ishak Ibn Ibrahim ('Expedition to the Euphrates and Tigris,' vol. i. p. 27). Its present name of Es Sook, or the Bazaar, is given to it by the Arabs, from its bearing, in places where it has been deepened, some fanciful resemblance to a bazaar. This name is not an uncommon one apparently for old canals, there being two so called close to Baghdad.

I may here remark that, as a rule, the canals which appear to have been navigable have low banks, but slightly raised above the surrounding level. They generally wind considerably, and have ruins on their banks, often lining them for miles. In some places, near large ruins, they appear to have regularly built sides. From these streams irrigants were given off, and led over the country in every direction possible. These have frequently high banks of from 20 to 30 feet, and in some instances even higher. This is accounted for from the fact that the running streams were kept clear by the rush of water through them; whereas the derivations from them were only used during the spring or early summer, when the rivers are high. These had to be cleared out yearly of the deposit left by the muddy waters. This was heaped up on the sides till they had reached such a

height that it became less laborious to dig a new canal than to travel up the steep sides of the old one with the mud dug out of the bottom. Thus five or six canals, with formidable high banks, may be seen running side by side for miles, the parent stream being so indistinct that at times it is difficult to trace it. This system of deepening and digging new canals is carried on at the present day.

The supposed navigable canals or constant streams are marked, on the map, with two open lines, the supposed unused irrigants with black lines. The ruins on the banks of the Sook are so considerable that several have supposed the site of Sittaki to be here. Though the swamp from the Saklawiyeh canal has done its best to obliterate these ruins, yet the country around is still covered with bricks and débris of buildings, to such an extent that there are at first sight good grounds for this supposition.

There are two hollows along the line of the Sook which have apparently been made by the rush of water from the Saklawiyeh marsh. They are half a mile apart. The southern one is called Ain, or Aineh Hadawiyeh, and the northern, Ain Serakha. Ain is the Arabic for a spring of water. The Serakha pond is about 180 yards in diameter, and so deep that water remains in it all through the hot season. On the eastern bank there is a ruin completely below the level of the ground. It is composed of bricks embedded in bitumen. These are 13 inches square, and $2\frac{1}{2}$ to 4 inches thick; they are cut out of the bitumen in which they are embedded, and carried to Baghdad for sale.

The town of Kathemain is clustered round, and derives its name from, the tomb of two Imams buried there. These are Imam Musa el Kathem, the seventh in direct ascent from Fatima, the daughter of the Prophet, and his grandson, Mahomed bin Ali Reza, surnamed El Taki, or the Pure. The tomb consists of two domes, covered with gilt tiles, and four minarets, very prettily built with enamelled tiles. The whole is enclosed within four high walls, which partially hide the sacred precincts from the eye of the unbeliever. From a distance the domes present a very beautiful appearance, and serve as landmarks for many miles.

Kathemain contains about 15,000 settled inhabitants, whose numbers are swelled by influx of pilgrims. These are all of the sect of Shiahs. Four miles to the south-east of this shrine stands the tomb of Zobeyda, the favourite wife of Haroun el Rasheed, a name familar to all readers of the 'Arabian Nights.' This has been piously kept in tolerable repair up to the present time, and was accessible not many years ago, but the entrance is now bricked up.

A survey of Baghdad and its environs on a large scale was

made by Commander Jones and Mr. Collingwood, of the Indian Navy, and forwarded to Government, with a memoir on the province. These were published in the Bombay Government Records, No. XLIII. It will be sufficient to note here that Baghdad was built in the year 145 of the Hegira (A.D. 762), by Munsoor, the second Khalif.

The accounts given by the Arab historians are both interesting and amusing. Many of these stories concerning the building of the town and the events that occurred during the reigns of the Abasside Khalifs, have found their way into 'Crichton's Arabia' and other works.

In A.H. 656, Mustassem Billah, the last Khalif, was put to death by Hulaka Khan when he captured the city. Most of the public buildings were then destroyed, and it is probably due in a great measure to this prince that Baghdad of the present day shows but few traces of its former magnificence.

After being taken and retaken by the Turks and Persians, Baghdad was finally conquered by Sultan Murad IV., in A.D. 1638. "Since that period," to quote Crichton, "the once illustrious city of the Abbassides has been degraded to the seat of a Turkish Pashalic." Among the few remaining ruins that mark the Abbasside dynasty in Baghdad may be seen the Medresseh or College built by Mustanser, in the year 630 of the Hegira (A.D. 1232). The inscription on it is being now restored. One of the oldest buildings in the town is the minaret of a mosque called Jama es Sook el Ghuzl, after the thread-market near which it is. Commander Jones determined the position of this minaret, which he gives in his map of Baghdad, as in lat. 33° 20′ N., long. 44° 25′ E. Close to the westward of Baghdad are several deep openings of the Saklawiyeh canal, or, more properly speaking, of the marsh formed by the Saklawiyeh. Through one of these, Masaoodi, Captain Lynch brought the *Euphrates* steamer in 1838. The Saklawiyeh is now closed, both on the Euphrates and Tigris.

The large and conspicuous ruin now called Akr Kûf is $10\frac{1}{2}$ miles, a little north of west, from the bridge of boats at Baghdad. This ruin is composed of sun-dried bricks, 14 inches square and nearly 4 inches thick. Between the layers of bricks is one of reeds or mats, and between every seventh and eighth an extra thickness of these reeds can be noticed. This mass of sun-dried bricks is solid to all appearance, is nearly square in shape, and stands on a ruin of apparently kiln-burnt bricks and lime. It is surrounded by extensive ruins, which have been partially opened by Mr. Loftus.

A canal appears to have passed close to the eastward of Akr Kûf, but as I have traced it till it was lost in the Saklawiyeh

swamp, I am unable to say from which river it came. Akr Kûf is spoken of by Chesney, and also in Rawlinson's 'Ancient Monarchies,' as being on the Saklawiyeh. It is supposed by General Rawlinson to be the ruin of a Parthian town occupying the site of an earlier Chaldean city (Note to p. 27, vol. i. 'Ancient Monarchies'). It is marked in Chesney's map as the ruin of Accad of the Bible, and in Mr. Rawlinson's work as the site of Duraba. Its summit is now 126 feet above the level of the raised ground near it, and the shapeless mass can be distinctly seen from both rivers. Yakuti, speaking of Akr Kûf, says it was supposed in his time (about A.H. 613) to have been the burial place of Sassanian kings.

The Abu Ghurraib is a modern canal, now in use, emanating from the Euphrates at a point 34 miles west of Baghdad, and about 68 miles direct from Hillah. This canal appears to have been cut in the bed of the Nahr Aeesa, an old canal of the time of Munsoor, the founder of Baghdad. The Saklawiyeh canal, which leaves the Euphrates about 6 miles above the Abu Ghurraib, is supposed by Chesney ('Expedition to the Euphrates and Tigris,' vol. i. pp. 32 and 55), and others quoting him, to correspond with the Nahr Aeesa. My reasons for thinking that the Abu Ghurraib and the Nahr Aeesa correspond are as follows:—There is a ruin of a tomb now in existence on the Abu Ghurraib canal, which is described in the 'Majm el Buldan' of Yakuti as being on the Nahr Aeesa. Besides this evidence, there is that of the Zoaba Arabs, the present cultivators of the Abu Ghurraib district, who frequently told me that their canal was cut in the bed of an older stream called the Aeesawi. Chesney considers the Abu Ghurraib to coincide with the Nahr Serser of Abul Feda (Map No. 7 of the Series, and vol. i. p. 55 of his work), yet, in the next page, he says the Abu Ghurraib corresponds with the El Melik, a canal to the southward, which I will presently describe; also at p. 281, vol. i., where he says the ruins of Kush are on the Nahr Malka; these ruins he has previously identified with Sindiyeh, and placed them on the Abú Ghurraib or Nahr Serser. There is great confusion in the letterpress as to these canals, but in the map they are very distinct, and the Abu Ghurraib is marked as the supposed Nahr Serser of Abul Feda. Either of the two canals now called Abu Sumak and Sewadiyeh might correspond with Abul Feda's Serser. These may have been cut in the bed of older streams, but they had not sufficiently the characteristics of navigable canals to warrant my marking them as such. The old name of Serser as applied to a canal seems quite unknown to the present Arabs.

Abul Feda says the Serser left the Euphrates below the

Aeesa till it comes to Serser, which is described by Edrisi as a flourishing commercial town, 9 miles from Baghdad, on a navigable canal on which there is a bridge of boats. After watering all these countries, he says, it joins the Tigris between Baghdad and Modain ('Expedition to the Euphrates and Tigris,' vol. i. p. 56). Yakuti, in the 'Majm el Buldan,' says "Serser —two villages within the limits of Baghdad, the great Serser and the little on the Nahr Aeesa, and *sometimes called the Nahr Serser*, and the distance between the little Serser and Baghdad is two fersakhs, and it is on the road to the Haj from Baghdad, and was called in former days Serser Ed Deir."

Where two such good authorities as Abul Feda and Yakuti disagree, it is difficult to form an opinion, but it seems probable that the Nahr Serser was a branch of the Nahr Aeesa.

At a place called Munfuth (meaning a place where water flows), the old stream which I have thought was the Nahr Aeesa bifurcates: one branch going on to the Tigris, a little south of Baghdad, and the other taking a more southerly direction. There are ruins in great abundance at this spot,—in fact, in wonderful profusion; and the distance from Baghdad of 17 miles almost corresponding with that given by Edrisi, they might very probably be the ruins of the town of Serser,* in which case the southern branch canal might be the Serser, as described by Yakuti.

Senadiyeh, or Sindiyeh, which I have previously mentioned, is the ruin of a handsomely-built mosque or tomb. It is on the Abu Ghurraib, and is distant 20½ miles from Baghdad, from which it bears about W.S.W. It is falling fast into decay, the dome having fallen in. Yakuti mentions this place, and says that it took its name from a man of Sindwan, who was in or governed the district; and he seems to say, for he is not very distinct on the subject, that this man died there in A.H. 503. The tomb is apparently of a later or Abasside time. The appearance of the ground in the neighbourhood would show that this, as most other buildings now standing, was erected on others then in ruins. This spot was visited, according to D'Anville, by both Balbi and Texeira. A mile and a half to the eastward of Senadiyeh a branch canal leaves the Aeesa, going to the northward; it is called the Akatum, and has every appearance of having been a permanent or navigable stream, as the ruins on its banks are very considerable. I have only traced this stream 7 miles from the fork, as my work ends there. I may be wrong in saying this stream came from the Aeesa, for I had no level and have not ascertained the dip of

* "Serser"—Arabic for cricket.

the country. This is generally from north to south, and I may find that this canal took that course.

There are several very peculiar old beds of streams or canals to the westward of Senadiyeh, such as I have only met with in this part of the country. They are 35 to 40 paces broad, and run for miles in a perfectly straight line. They have no ruins on their banks, and in a distance of 30 miles have only two branch canals emanating from them. Had it not been for these two canals I should have taken them for old embankments, although they are now only a foot or two above the level of the ground. The Arabs use them in the winter, when the ground is swampy, as roads, and call them all "Towaeel," which is the diminutive of the word meaning length. They have no idea what they were for, or when they were used, and they are equally a puzzle to me. I have marked them, on the map, with two open lines as navigable canals.

Four miles to the westward of Senadiyeh is a mound called Kuneeseh, or Kunaseh. This name at once attracted our attention, from the fact of the battle of Kunaxa having been fought in the neighbourhood, and from the strange similarity of the two names, Kunaseh being the nearest approach that an Arab could make to Kunaxa. In a country where names of mounds are frequently changed—except, indeed, the larger ones—it seems improbable, and almost too good to be true, that this one particular spot, the site of which has been so long sought for, should have kept its name intact for nearly 2300 years.

Chesney and Ainsworth, who have been over the very ground, have not noticed the name of Kuneeseh, which is the more remarkable, as this mound seems to correspond with that called Abu Ghurraib in the map of the expedition under Chesney. Kuneeseh is the Arabic for "church," and I believe the Hebrew word is very similar. I venture to think that the name Kunaxa, given to the battle on the authority of Plutarch, may be a corruption of the Hebrew word, and that the battle was actually fought at this spot. There could not be a better authority on this point than Mr. Grote, who says, "Following, therefore, the distance given by Plutarch (probably copied from Ktesias), we should place Kunaxa a little lower down the river than Felujah; this seems the most probable supposition" ('Grote's History of Greece,' vol. ix. note 2 to p. 56). The mound of Kuneeseh is 17 miles from Felujah, and $51\frac{1}{4}$ in a direct line from Babel, the northern mound of those marking the supposed site of Babylon. This agrees, as nearly as may be, with the 500 stadia of Plutarch, which he gives as the distance between the two places.

Whether this supposition be correct or not, there is nothing,

I think, in Xenophon's account of the advance or retreat of the Greeks that would disprove it. In following the tracks of the Greeks, I will take Pylœ as a starting-point. This is marked in Chesney's map as 22 miles from Hit. Commander Jones, of the Indian Navy, a former surveyor in Mesopotamia, thinks it should be identified with a place called Bekaa (9½ miles to the south-eastward of Hit), from the fact of the Arabic word Bekaa having about the same meaning as the Greek Pylœ, and from the fact that there is actually a narrow pass at that place ('Bombay Selections,' No. XLIII., p. 263, note). From Pylœ the Greeks in three days marched 12 parasangs; then, in one day, 3 parasangs. It was in the middle of this march that they came to the trench supposed to have been cut by Artaxerxes, and passed it by a narrow passage of 20 feet. This description will exactly apply to an irrigating canal in the process of construction. A passage of about 20 feet broad is always left to keep out the water of the river while it is being dug, or till the time for watering the land arrives. Further on, Xenophon says it was not the time for watering the crops (p. 88, 'Spelman's Xenophon'). As to the trench extending 12 parasangs to the Median wall, this could only have been stated on hearsay evidence. Xenophon then mentions the four canals which are in the plain. Chesney seems to lay great stress on this passage, for, in vol. ii. p. 216, he says, "The Isa, the Nahr Serser, and other canals were so many successive lines of defence." Whereas these canals were cut more than eleven hundred years after the battle. Mr. Grote, in the map accompanying the 9th volume of his 'History of Greece,' has placed these canals to the southward of Kunaxa. He also notes that Major Rennell, Ritter, Mr. Ainsworth, and Chesney, have wrongly interpreted the words of Xenophon, who does not say that Cyrus ever passed the wall of Media or these four canals before the battle of Kunaxa ('History of Greece,' vol. ix. p. 88). Xenophon says the water was derived from the Tigris and fell into the Euphrates, and he repeats this statement about the two canals passed after the battle. This seems to be a mistake, as all the canals in this part of the country would, from its dip, be necessarily cut from the Euphrates to the Tigris. To continue in the footsteps of the Greeks. They had already marched from Pylœ 15 parasangs, and if 7 parasangs are allowed for the next two marches, it will give 22 parasangs from Pylœ to the field of battle. Bekaa is distant from the mound of Kuneeseh 59 miles, in as straight a line as it is possible to go. This divided by 22 would give nearly 2¾ miles to the parasang, which is about correct. It is worth noticing that the pebbly ridge close to Kuneeseh would exactly answer to the descrip-

tion of the hill mentioned by Xenophon, on which Artaxerxes' cavalry made a stand after retreating from the Greeks. Mr. Ainsworth, in his 'Track in the Footsteps of the Ten Thousand,' says he supposes this eminence to have been a tel or artificial mound, as there are no natural mounds in the country; but he is mistaken in this latter assumption, for the ridge I allude to is 13 miles long and 80 feet high, if not more.

The direction of the retreat of the Greeks from their encampment, a day's march to the north of the battle-ground, has given rise to much discussion. Xenophon says, "as soon, therefore, as it was day, they began their march, with the sun on their right" ('Spelman's Xenophon,' p. 84). This, at first sight, would appear to be a northwardly or north-north-eastwardly direction; and the difficulty is to reconcile this with the very next words, "expecting to arrive by sunset at some villages that lay in the country of Babylon," and with the fact that they did eventually arrive at Sittaki, a city on the road between Babylon and Susa, or to the eastward of the former city. Mr. Grote thinks that by the sun on their right hand was meant the mid-day sun ('History of Greece,' vol. ix. p. 76, note). Is it not possible that the Greeks may have made a détour, wishing to avoid the troops of Artaxerxes, and, perhaps, keeping the pebbly ridge between the enemy and themselves?

The position of Sittaki has been variously placed. Chesney supposes Sheriat-el-Beytha to have been the site (vol. ii. p. 221). Sir Henry Rawlinson, on the testimony of Captain Jones, thought that the western suburbs of Baghdad were built on the ruins of Sittaki (Bombay Government Records, No. XLIII., note to p. 3). Mr. Grote has placed them on the eastern side of the Tigris, and about 3 miles to the southward of Baghdad (map accompanying vol. ix.). Mr. Rawlinson, in the map prefacing the first volume of his 'Ancient Monarchies,' has placed Sittaki, or Psittace, 33 or 34 miles to the south-eastward of the Diyaleh river, and on the eastern bank of the Tigris.

Strabo says that Sittaki was on the road from Babylon to Susa, and 500 stadia from the former city. I shall venture at present upon no opinion of my own as to the proper position of Sittaki, but shall suppose it to have been near that marked in Mr. Rawlinson's map. As I have only seen the first volume of the 'Ancient Monarchies,' I do not know what ruins Mr. Rawlinson supposes to have marked the site, or by what name they are now known. Some ruins on the eastern bank of the Tigris, now called Deir, might correspond with Sittaki of Mr. Rawlinson. The Tigris flowed at one time apparently to the eastward of Deir; for Lieutenant Collingwood, who surveyed the country opposite this ruin, and traced canals running towards it, says,

"I traced straight on towards the river, and from the top of 'Abdulla,' a mound a little to the southward, saw mounds on the opposite bank leading to Deir, evidently the continuation of the canal. The other canals I did not quite follow to the banks —high brushwood intervening; but they all centered in the same spot, and the people there informed me that they all reappeared on the opposite bank" (Extract of a letter to Colonel Kemball, C.B., Political Resident, Baghdad). The mounds of Deir are situated, according to Lieutenant Collingwood's map, at a distance of 67,000 yards from Babel, and 66,000 yards from the mouth of the Diyala River, near which spot Mr. Rawlinson places Opis, and to which I shall allude further on.

The Greeks, after three days' march, passed the wall of Media. The position of this wall has been much discussed. From the discoveries of Captain Lynch and Dr. Ross it was supposed that the ruins of the Median wall could be traced stretching across from the Tigris at latitude 34° 3′ N., in a south-south-westerly direction to the Euphrates. Commander Jones, who examined the spot in 1850, says of it, "neither in its construction or extent will it in any way answer the description of the ancient writers" (Bombay Government Records, No. XLIII., p. 263). Mr. Grote, quoting this, says, "From this important communication it results that there is as yet no evidence now remaining for determining what was the line or position of the wall of Media, which had been supposed to be a *datum* positively established, serving as premises from whence to deduce other positions mentioned by Xenophon" (vol. ix. note p. 88). A line drawn from Tel Kuneeseh to the ruins of Deir would exactly touch the ruin of a wall now called Hubl-es-Sukhr, or line of stones or bricks. The ruins of this wall may be now traced for about $10\frac{1}{2}$ miles, and are about 6 feet above the level of the soil. It was irregularly built; the longest side running E.S.S. for $5\frac{1}{2}$ miles, it then turns to the N.N.E. 2 miles, then east $1\frac{1}{2}$ mile, turning down S.S.E. for another mile and a half. An extensive swamp to the northward has done much towards reducing this wall. The two caravanserais at Khan-ez-zad are also in a great measure built of bricks from it, and it has doubtless supplied materials for many other buildings. There is a considerable quantity of bitumen scattered about, and it was probably made of bricks set in bitumen. I can see nothing in Xenophon which would show that this is not the wall the Greeks passed, for what he says of its length was merely what was told him. I think that this must be the ruin of the wall called that of Media which Xenophon describes; but I mention this supposition with much diffidence, and for the benefit of those better able than myself

to judge of its being correct. The distance from the northern point of this wall, as now seen from the encampment, might be, allowing for a détour, about 32 miles. Whether this was done in three or four days' marching has been disputed, but I do not think that this is of much importance either way.

"From thence they made, in two days' march, 8 parasangs, and passed two canals, one upon a bridge and the other upon seven pontoons." These two canals might have been the Nahr Malka, and the old canal, the bed of which is now called Hubl-ed-Dthehheb. This latter was either a continuation of the Nahr Malka or a stream from the Tigris.

Allowing the 8 parasangs to be 24 miles, and that the Greeks crossed the second canal at the end of these marches, they would have done so at a point nearly 12 miles south of Ctesiphon, and nearly 15 miles from Deir, which I have already said seems to mark Mr. Rawlinson's Sittaki. Xenophon, after stating that they crossed these canals, says, "thence they came to the river Tigris, near which stood a large and populous city called Sitace, at the distance of 15 stadia ($1\frac{1}{2}$ mile) from the river" ('Spelman's Xenophon,' p. 94). It seems to me that another day's march could be allowed from the canal crossed by a pontoon bridge. The island on which Xenophon says Sitace stood would have been formed by the Tigris on one side, the old stream now called Hubl-ed-Dthehheb on the other, and, perhaps, two branch canals. After crossing the Tigris, the Greeks marched 20 parasangs in four days to the river Physcus, on which stood the large town called Opis. The position of this spot has not been determined as yet. Mr. Rawlinson, in his map (accompanying vol. i. of his 'Ancient Monarchies'), puts it on the Diyaleh, which he supposes was the Physcus, and about 3 miles from the Tigris. Chesney has placed it 57 miles to the northward of Baghdad, close to one of the heads of the Nahrwan canal. Captain Lynch, of the Indian Navy, had previously supposed it to be on the same side of the Tigris (the eastern), but about 19 miles more to the eastward (Map No. VII. of the 'Expedition to the Euphrates and Tigris'). Mr. Grote has given Opis the same site as Chesney apparently (map in vol. ix.). Commander Jones, in a paper sent in to Government in 1851, announces the discovery of the site of the ancient Opis, which he supposes rather confidently to be marked by the ruins at a place called Manjûr, about 38 geographical miles north of Baghdad (Bombay Government Records, No. XLIII., p. 215). I have mentioned where Mr. Rawlinson places Opis, but I am unaware what ruins he supposes mark the site. Whether I am correct in any of the suppositions I have mentioned or not, I think I

am justified in saying that nothing but a very careful survey of the country to the northward will ever be of any use in determining whether the positions at present assigned to any of these places be correct. The matter will not, I imagine, be considered decided as long as it is uncertain what evidence may be obtained from the country to the north-west of Baghdad, which is as yet unsurveyed. In a casual trip across the country important ruins might be very easily overlooked; and it is notorious how little the statements of the Arabs can be trusted, when from laziness or fear of other tribes they wish to avoid scouring the country. Commander Jones seems to have found this to have been the case when he was examining the embankment supposed to have been the Median wall.

Five and a half miles to the east-south-eastward of Kuneeseh are the remains of what appears to have been a house or fort, surrounded by a rampart. A small hill of pebbles has been taken advantage of to build it with. The walls or ramparts are about 18 feet high, and have others projecting from them. The main ones surround the building or ruin, the whole covering about a square mile of ground. Less than a mile to the eastward is another similar ruin, but smaller. They are both known by the name of Dowair, which is the diminutive of Dour, a circle.

There are two very high mounds in this neighbourhood, both called Akr or Akar. Akr-el-Ajedeh * is $1\frac{1}{2}$ mile east of Kuneeseh, and is a most imposing-looking mound. It is built of kiln-burnt bricks, and is 74 feet high, by far the highest in the area comprised by my map. It does not cover much ground, being 220 yards long. The other Akr, which is distinguished from its namesake by the word Gherbi or the west, is in the north-west angle of the map, and a little north of west, distant 9 miles from Akr-el-Ajedeh. This mound is built of sun-dried bricks, and is not so large as the other one.

The mound of Kuneeseh is about one mile in length, and about 35 feet high. It is separated by a chasm into two parts, and is covered with a loose nitrous soil called in Arabic Subkh. Indeed, the country close to the southward is as white with saltpetre as if it had been covered with a thick fall of snow.

The next old navigable canal to the southward is one which is universally allowed to correspond with the Nahr Malka, Basileios-Potamos, or Flumen Regium of the ancient geographers and historians. The Ruthwaniyeh, a canal, now in use,

* There are many meanings in Freytag's dictionary corresponding to a mound or palace or keep, applicable to either Akr or Akdeh. The K and the J being often interchangeable (though not correctly) this latter word may be pronounced Ajdeh.

but with several mouths of older date, has been cut apparently for a part of its course in the bed of the Nahr Malka. A part of it, which is unused, now reaches an old village called Ibrahim-el-Khaleel, beyond which the Ruthwaniyeh seems never to have extended. This village has some well-built houses in it, with an upper story to the rooms. The tomb of Ibrahim-el-Khaleel is now in ruins. The Arabs say this village was built by a Pacha of Baghdad, for a favourite daughter, and was in existence in the beginning of the century. It is 20 miles south-west of Baghdad; $2\frac{1}{4}$ miles to the east-south-eastward is another old tomb in ruins, called Sheikh Samer. From Ibrahim-el-Khaleel, the Nahr Malka, which is now called the Yuseffiyeh, takes a direction of south-east by east with many twists, and many ruins on its banks. Following the old stream, we come to a very curious ruin called Abu Hubba, which bears south-south-west from Baghdad, distant 20 miles. Here the stream bifurcates, one branch, the Yuseffiyeh, going on towards Ctesiphon, and the other, which is simply called El Trab, or soil, taking a more southerly course.

Abu Hubba itself consists of a mass of ruins of a very irregular shape. The highest part, which is 59 feet high, is of a dome shape, and is on the south-west side of the building. This ruin is surrounded on three sides by a rampart or wall, in shape a rectangle, with openings every here and there. This is 30 feet high in places. The building inside is skirted on the south-west face by the branch canal from the Nahr Malka, and it extends from that till it touches the north-east face of the rectangle. Its length is 1300 yards, and breadth 900 yards. Deir, another ruin close to northward of the Nahr Malka, is something similar in shape to Abu Hubba, and is distant from the latter three miles to the north-eastward. The ramparts of Deir are, if anything, higher than those of Abu Hubba, but in shape are roughly a quadrant of a circle. There are traces of branch canals or intrenchments round both these ruins. They have the appearance of fortified camps, something like the old ones I have seen in the north of France.

The Yuseffiyeh, or Nahr Malka, flows on with very sharp bends, and giving off many high-banked irrigants, passing close to the southward of Khan-ez-zad. On the northern bank of the old stream, and distant 11 miles from the Tigris and $1\frac{3}{4}$ mile from the Khan, are some very extensive mounds, now called Ghazelliat. They cover a large surface of ground, and from the quantity of burnt date-wood to be seen amongst the débris in places where they have been opened for bricks, they appear to be ruins of buildings destroyed by fire.

In a bight of the Nahr Malka, and $1\frac{1}{2}$ mile to the eastward

of the principal Ghazelliat mound, is a Tel, or ruin, called Muneyter; this word is probably taken from the root Nutter of the verb to watch, forming its noun of place Muntur, and diminutive Muneyter. This mound, though not large, is worthy of note, for it is covered in great profusion with iron slag, and cropping above the surface are remains of what appear to have been furnaces for melting iron. They are of baked clay and bricks, circular in form, and varying in diameter from 5 to 10 feet. Branch canals from the Nahr Malka appear to have intrenched this building.

Another mound, two miles to the southward, called Sukhr-eechy (derived from the word Sukhr, a stone), has a still greater profusion of iron refuse on its surface and in its neighbourhood. Not knowing the nature of this débris, I put my prismatic compass on a small heap of it to take a steadier bearing, and was surprised to find the needle deflected several degrees.

From Muneyter the Nahr Malka is called Hubl-es-Sook, and flows on with various twists in a south-easterly course to the river, close to which its banks are very high; this part of it having apparently been frequently deepened. At the distance of nine miles from the river a canal, with high banks, has left the Nahr Malka, going to the eastward, having apparently joined the Tigris above Seleucia. Another, one mile to the westward of this one, also leaves with a northerly course towards the river. At the point where these emanate from the stream, their banks are very high. The Arabs call these places Shibbij, which may be a corruption of Shebak, a net, for there is literally a net-work of canals at these places, most of them only going a short distance. One of these two canals, extending close to the Tigris, might correspond with that cut by Trajan, and re-opened by Julian to take their boats into the Tigris above Ctesiphon.

There are very extensive ruins all about this spot, marking the ancient site of Seleucia. After the decadence of Babylon, and the death of Alexander the Great, Seleucia was founded by Seleucus Nicator, about 300 B.C., and became the capital of Babylonia. A most interesting account is given by Gibbon of the rise and fall of Seleucia and Ctesiphon, successively the chief city of Babylonia. When the latter city became a powerful Parthian town, Seleucia declined in power. It was sacked and burned by the Generals of Marcus, A.D. 165, and never recovered the blow (Gibbon, p. 78). Trajan had previously captured Ctesiphon (A.D. 107), but it had been restored by Hadrian to the Parthians. In 198 the Emperor Severus attempted the capture. The Emperor Valerian was taken

prisoner, and tortured to death at Ctesiphon. It was at this time that Odenatus, Prince of Palmyra, and husband of the celebrated Zenobia, attempted his rescue, but Sapoor, although defeated in the field, managed to hold the city. The Roman Emperor Carus captured both Seleucia and Ctesiphon in A.D. 283, but being killed by lightning, the Romans were compelled to retire. In A.D. 363, Julian, after capturing Perisabor and Moaga Malka, also tried to take Ctesiphon, but failed. Perisabor was a corruption of Ferooz Saboor, a city which was also called Anbar. The ruins are still known by this latter name, and are about two miles north of Felujia. Though not in my work, I rode over to see the ruins of a town once so celebrated. Chesney supposes that a mound marked Tel Akher marks the site, but he seems to have been to the very spot, and strangely missed the name; for a mound marked Medina-Ombarra, in his Map No. 7, seems to be meant for Anbar, or to occupy about the position. The city of Moaga Malka, that was afterwards taken by Julian, was 11 miles from Ctesiphon. Gibbon says, "the city or rather fortress of Moaga Malka, which was defended by sixteen large towers, a deep ditch, and two strong and solid walls, appears to have been constructed at the distance of 11 miles as the safe-guard of the capital of Persia." I do not know whether the position of this city or fortress has been in any way determined, but, perhaps, either the ruin now called Shaishebar or the Ghazelliat mounds might mark the site. Shaishebar, which is 11 miles from Seleucia, might mark the spot. It is a ruin of a square tower built of sun-dried bricks, in shape and appearance like Akr Kûf, only much smaller. It is on an old canal, and has very many mounds all about it, and débris of buildings cover the soil for miles. I have no idea what the meaning of the word is. I have not, I am sorry to say, a copy of Ammianus Marcellinus, but I see that Gibbon says after the capture of Moaga Malka it was so destroyed that not a vestige was left to show that such a city had ever existed.

In the reign of Chosroes Nushirwan, from 531 to 579, the Parthian Empire became so powerful that Gibbon says of this king—"victorious and respected among the Princes of Asia, he gave audience in his palace of Modain or Ctesiphon to the ambassadors of the world. Their gifts or tributes, arms, rich garments, gems, slaves, or aromatics were humbly presented at the foot of his throne"—(p. 696). It is the ruin of this palace which is now to be seen, and which is still called Tak Kesra, or arch of the king.

As the ruin now stands, it consists of a magnificent arch, 86 feet high from the under part of the ground, and 82 feet

broad at the foot. From this arch a vaulted room extends 153 feet to the rear. The roof of this has partially fallen in, and tradition says the place was struck by lightning in the year of the Prophet's birth. The building faces the winter sunrise, or east-south-east, from which direction it has a most imposing appearance. The front walls of the two wings are alone standing, the rooms having fallen in. In the centre of the arch are marks of thousands of bullets that, report says, were fired at a huge ring which supported the curtain of the audience chamber. This ring had, doubtless, excited the cupidity of the Arabs during many centuries, and defied all attempts to remove it till gunpowder put a more formidable agent into the hands of its many enemies. Mr. Rich was told that this ring proved to be of gold.

Ctesiphon is now the only Parthian or Sassanian ruin in this part of the world not converted by time and decay into a heap of rubbish. It was finally conquered by the Mahomedans soon after the death of the Prophet. Of the two cities of Seleucia and Ctesiphon or el Modian there are not as many ruins as might be expected to mark their sites. Of the former, Tel Omer and Sirhan, two mounds of no great size. (The former was opened by Mr. Taylor, now Her Majesty's Consul at Erzeroom and Diarbekr.) There are also the remains of a wall which abut on the river, where it is upwards of 30 feet high. This was built of sun-dried bricks, and appears to have surrounded the mound of Sirhan. It continues in the same direction on the eastern bank of the Tigris, and, if we did not know that the rivers separated the two cities, as it now does their ruins, one would be apt to think that it formerly flowed to the northward of the latter city. There is a swamp near Tel Omer which has doubtless swallowed up many of the ruins of Seleucia, as low mounds and ridges of bricks and lime can be traced all over it. Round about Tak Kesra are some low ruins of buildings and a few small mounds. A canal seems to have passed close to the westward of the palace, and was probably from the Nahrwan. To the westward of the palace are the ruins of a wall similar to that on the opposite side. This forms an arc of a circle, both ends abutting on the river, with ruins of buildings enclosed. A mile and a half to the east-south-eastward is another wall, called by the Arabs Soor-el-Bostan, or garden wall. It forms a right angle, with both ends on the river. There are two old tombs near Tak Kesra, one called Sulman Pak and the other Hadaetha or Hadaefa. They are both supposed to have been contemporaries of the Prophet, the former is popularly believed to have been his barber. The Tigris, after flowing past the ruins of Modain, continues to the

southward for about five miles, and then turns sharply to the northward for about the same distance, forming a very peculiar bight. Exactly in a line with the direction of the Hubl-es-Sook or Nahr Malka, and on the opposite side of this bight are the traces of a canal or navigable stream, which I have previously mentioned, called Hubl-ed-Dthehheb. There are marks in the Ctesiphon bight which would show that in former years the bottom of the bight was to the northward of a line drawn across, connecting the two streams. I cannot help thinking that the Hubl-ed-Dthehheb was a continuation of the Nahr Malka. I am aware that almost all the ancient authorities (Pliny, Ammianus, and Polybius) agree in stating that the Nahr Malka fell into the Tigris at Seleucia, but Ptolemy, I believe, says it fell into that river some distance below Seleucia.

It would certainly have been of enormous advantage to the country to the southward of Seleucia if the waters of the Euphrates, brought down by the Nahr Malka, had been conveyed over it. It is true that this might have been done by irrigants, still leaving water enough to form a navigable canal flowing into the Tigris at Seleucia. That the Nahr Malka and Hubl-ed-Dthehheb appear to have been one stream, a glance at the map will show.

Abul Feda says, the el Melek was the next canal to the southward of the Serser. Yakuti says, it is beyond the Nahr Aeesa, and watered 360 villages, and that it was dug by Solomon, the son of David, according to some, and by Alexander the Great according to others. The branch that leaves the Yuseffiyeh, at Abu Hubba, again bifurcates at a place four or five miles to the south-eastward, called Khushm-ed-Dhteeb (or the Wolf's Nose). There are several smaller canals at this spot radiating in different directions, and extensive ruins lie scattered about. The stream at this point must have been frequently deepened, as the canals have very high banks. One of the main branches passes close to the ruin called Shaishebar, which I have previously mentioned. From Khushm-ed-Dtheeb the other branch goes to the south, turning after $1\frac{1}{2}$ mile due east, gradually assuming the appearance of an irrigating canal. Close to the southward, and passing within a few hundred yards of this last stream is the bed of another old navigable one, the Arabs call this Abu Dibbis. It leaves the river 34 miles above Babel, and flows close to the northward of a ridge of pebbly formation. It is very indistinct in places, the ground having at one time been a swamp. Numerous high banked canals seemed to have joined these two streams, taking the water of the northern into the southern one, after its own mouth had become

choked up or unused. This spot is also called Khushm-ed-Dtheeb, and the old canals form a perfect network, and cross one another in such confusion that it is with the greatest difficulty that the parent stream can be traced. It winds considerably, and has ruins on its banks; indeed, were it not for the débris on its banks and the abrupt endings of the high-banked irrigants, it would, in places, be impossible to trace it.

This stream must have taken nearly all the water of the Euphrates (left by the Nahr Malka), if it was not that river itself. From the paucity of ruins on the Euphrates to the southward of the Abu Dibbis, and from the immense number on this stream, it would appear that the old Euphrates flowed to the eastward of the pebbly ridge, which extends 13 miles south-east and north-west. There is a narrow gap between this ridge and one on the opposite side of the present Euphrates, between which that river flows. A canal might have been cut through this gap, which gradually enlarged till it took the whole of the river. What would seem to make this probable, is the fact that the old stream, which flowed to the eastward of this ridge, appears to have joined the present course of the Euphrates above Babel.

The old bed of the stream I am now describing flows close to the westward of Khan Bir Eunus, goes on with many twists and ruins, passing close to the eastward of Khan Haswa, where it bifurcates. The western branch goes down towards Babel, and the eastern, called Hubl Ibrahim (hubl—a line), passes close to the westward of the huge mound called Tel Ibrahim. This seems to correspond with the Nahr Kuthiyeh of Abul Feda, which, he says, left the Euphrates below the el Melek, and that it divided into two branches, one going into a swampy country, and the other entering the Tigris below the el Melek. The western branch is called by Chesney ed Dhiyab, but though I asked many Arabs by what name it was known to them, they one and all said that it was generally called el Mutn, which means a hard or raised roadway.

I may here remark that there are several names in Chesney's Map not to be met with now. Notably, the mounds of Mahomed, near which he supposes the battle of Kunaxa to have been fought (Map No. VIII.), also the mounds he calls Ashik-wa-Mashukah, 10 miles below Modain (vol. i. p. 56), names which I did not hear from the Arabs.

The Mutn, which is also called el-Khoor, or the channel, at the spot where it leaves the Hubl-Ibrahim, goes on, with various twists or bends, towards Babel, near which it seems to rejoin the Euphrates. Four miles from the fork, and on the

western bank of the stream, are ruins, called Towaibeh. These are called the ruins of Kutha in Chesney's Map.

Towaibeh is not an uncommon name for ruins built of sun-dried bricks. The word itself is, I believe, an Arabic diminutive of the Turkish word Tabeah, or a fort of some kind. Akr Kûf, Akr-el-Gherbi, Shaisheba, Towaibeh on the Mutn, and another ruin, also called Towaibeh, 12½ miles to the north-west of its namesake, have all the same characteristics, and are the only ruins of the kind in this map. They have all a central solid tower of sun-dried bricks, with layers of reeds between the layers of bricks. They are surrounded by ruins of kiln-baked bricks, and lime, and bitumen. Canals or streams have passed close to them. They give one the idea of having been watch-towers, in the centre of the towns.

Towaibeh is close to the eastward of the road between Baghdad and Hillah, and would strike the eye of any one passing. It is not quite four miles from Khan Haswa. On the ruins to the north-westward of the tower are two round knobs, which exactly have the appearance of a porch or entrance to the building.

There are very extensive but low ruins all about Towaibeh. From here to the southern limit of the map, the Mutn has a great number of ruins on its banks. The plain to the eastward is covered for miles with débris of glass, pottery, glazed and unglazed, in such wonderful profusion, that however accustomed to the sight of ruins, one cannot but feel astonishment. For miles a horse cannot take a step without treading on glass or glazed pottery, made with a skill that is now completely lost even to the workmen of the capital of Turkish Arabia.

The other branch of this stream flows on (the present tense is only used for brevity), on with some very large ruins on its banks, till it reaches Tel Ibrahim, which mound, as I have already said, is the Kutha of Mr. Rawlinson. After passing Tel Ibrahim, the Hubl seems, by Lieutenant Collingwood's map, to have joined the Shat-en-Neel, and to have fallen into the Shat-el-Hye, a branch stream from the Tigris.

The mound of Tel Ibrahim is 17¼ miles to the north-eastward of Babel; it is by far the largest mound in this part of Mesopotamia, is 1000 yards in length, and about 60 feet high. Close to the south-westward is a smaller mound, on which is a tomb, from which the two mounds and the old stream now derive their names. In places where hyenas have made holes, and in places where rain has formed channels in its sides, the walls of the building are exposed. The surface is covered with more than the usual amount of débris of glass, pottery, and building material, and on one occasion, when I was riding across with

Colonel Kemball, we found vases full of débris of bones and earth. Kutha, according to Mr. Rawlinson (or Cutha as he spells it), was the city peculiarly dedicated to Nergal or Mars ('Ancient Monarchies,' vol. i. page 172). Seppara, or Sepharvaim, was, according to Mr. Rawlinson, distant 20 miles by a direct route from Babylon, and near Moseyb. There are no ruins of importance on the present Euphrates in this neighbourhood, whereas the old stream, now called El Mutn, is lined with ruins. Is it not possible that Towaibeh (the eastern one) might mark the ruins of Seppara or Sepharvaim?

That the Euphrates north of Babylon did not flow in one stream as it now does, is not only known from the ancient writers, but, also, from more modern historians and geographers, and the truth of their statement is borne out by the appearance of the country at the present day. Herodotus says, that Nitocris, Queen of Babylon, by digging channels above that city, made the river so winding that in its course it touches three times at one and the same village in Assyria (Cary's Translation, p. 80). The fleet of Alexander the Great was, for a time, lost in the windings of the Euphrates. Even so late as the time of Thevenot, 200 years ago, the broad Euphrates was lost in numerous channels carried across the country. Reauwolf, half a century later, says the river was not navigable lower down than a place called Rousvaine (Ruthwaniyeh); beyond this there were rocks dangerous for larger boats. As there are no rocks in this part of Mesopotamia, he, doubtless, alludes to the bricks and débris of buildings that lined the sides of the streams. He also says that, by clearing away the stones, the Euphrates might be made navigable to the Tigris. At Rousvaine, he says, the goods were landed and carried across to Baghdad, whence they were conveyed by boat to Busreh. He also states that the Euphrates divided itself into so many channels that the pilots lost their way very frequently. There is a ruined khan, or caravanserai, called Mujdum, or Mukdum, close to the Ruthwaniyeh, where boats still land lime and bitumen, brought from Hit for the Baghdad market, but such an indirect route for Busreh is not necessary now. The word Mukdum implies a place of bringing to, or making fast to the shore.

The Euphrates has, from the nature of the country, always been the river from which the great irrigating canals in this part of the country have been derived. Its bed is higher than that of the Tigris, and consequently its water has been easily led over Mesopotamia.

This accounts for the great changes that have taken place in the Euphrates even in modern times, whereas the Tigris has

apparently but slightly altered its course. At the present time it is with great difficulty that boats of any size can ascend the Euphrates at all. About 40 miles above its junction with the Tigris the river is spread over a vast surface of country, and the channel in the low season is in places only two feet deep, and not more than four yards across. This is a great inconvenience, but not an absolute impediment to boats ascending the river, as they generally take smaller boats, into which they discharge their cargo at this spot, re-shipping it further on. When I descended the Euphrates, with Colonel Kemball, in the spring of 1863, our boat had frequently to be dragged through the mud, and the reeds were touching both sides, although 30 years ago the steamers of Chesney's expedition passed up and down and found from 12 to 18 feet of water at this place.

A comparatively small outlay of money would not only render the Euphrates navigable, but would, by allowing the banks to be cultivated, add immensely to the resources of the Pashalic. Besides this, Busreh would become a healthy town instead of a haunt of dangerous fever. Although the country comprised in our map is in most places a barren waste, where formerly most extensive cultivation existed, yet it is not entirely uncultivated. No one who has not seen the country can have an idea of the effect that water has on the soil. The descriptions given by Herodotus of the fertility of the soil seem but little exaggerated.

The Turkish Government adopts towards the cultivators a suicidal policy. It is not so much that the taxes are heavy, but the system of bribery and peculation carried on by the officers of Government renders these taxes but a nominal part of the actual outlay. The present Pacha of Baghdad (Namik Pasha) is believed never to take a bribe, and is very severe to those against whom corruption is proved. But this is a most exceptional case, and is mentioned by Turks even with astonishment. In a country where an honest governor is a curiosity little improvement can be looked for in the condition of either the soil or the people.

Near Baghdad are large fruit gardens which line the river-banks: the date-trees being the most valuable part of them. Cultivation is also carried on along the course of the river, the ground on the banks being irrigated by machines called churds; these are of very primitive construction. The water is drawn up in leather buckets by horses or oxen; by an ingenious contrivance these empty themselves as soon as they have arrived at the proper height; the water is thence led over the country in small channels. The fields so watered seldom extend more than

two miles from the river-bank. Wheat and barley, besides millet, sesame, castor-oil, cucumbers, melons, beans, and other vegetables, are chiefly cultivated.

A system of irrigation by canals from the Euphrates still exists, although but a parody on that carried on by the ancient occupiers of the soil. There are seven respectable-sized canals derived from the Euphrates in the area embraced by our map. These are generally farmed from the Government. Last year, I am given to understand, the income derived from them by the Government was as follows:—

	Kerans.	
Abu Ghurraib	22,500	About 220 kerans equal to 100 rupees.
Ruthwaniyeh	6,000	
Mahmondiyeh	11,050	
Iskenderiyeh	1,150	
Moseyb	86,440	
Nasruiyeh	3,041	
Mahaweel	17,500	

The amount of gain from these canals, as well as the income derived by Government, is constantly fluctuating, and depends chiefly, in the first place, on the enterprise and capital of the farmers. But their gain or loss depends upon the amount of the rise of the river, as well as the contingency of a flight of locusts, which sometimes devour whole fields in a few hours.

I have seen the canals full of water in December, when much rain falls on the mountains, and a fresh comes down early. But the highest rise of the Euphrates is generally in May, and that of the Tigris in April.

The canals I have mentioned are from 7 to 15 yards broad at the mouth, and from 6 to 10 feet deep in the high season; they extend into the middle of Mesopotamia; the water is led away from them in branch canals till the main stream is all absorbed. There are many large mounds scattered about over the face of the country which I have not mentioned. A large mound called Tel Hubboos (from the word Hubbus, a prison), is $11\frac{1}{2}$ miles nearly due south from Ctesiphon. Ajeshiat, 7 miles south of Hubboos, and the same distance from Tel Ibrahim; Tel Dthubba (Hyena), close to the western point of the Hubl-es-Sukhr; Tel Abu Shinaeen (a watery plant which camels eat) on the Hubl Ibrahim and Abu Shiere (barley), both $8\frac{1}{2}$ miles from Tel Ibrahim, are all large ruins. The principal mounds are nearly all on old navigable canals; some of these appear to have had this character till they reached a large ruin, and thence the water seems to have been absorbed by irrigants. It is impossible at present to judge what breadth these streams were, as the traces of them often vary, within a mile, from 20 to 80 yards

in width, but in few instances do they seem to have exceeded 100 yards.

The country is dotted all over with tombs, generally called Imams by the Arabs. Many of these are of quite modern date, but little respect seems to be shown for many of them by the Arabs, as the older ones are in ruins; some, indeed, are only marked by a heap of bricks and a name.

There is a rather handsome Shiah shrine on the road to the Haj from Baghdad. It is close to Moseyb, and is called Awalad-el-Musleem, or children of Musleem. It has two rather pretty green domes. They are supposed to cover the graves of Ibrahim and Mahomed, sons (or grandsons, according to some) of Musleem, who was the nephew of Ali, son-in-law and cousin of the Prophet. Another tomb, to the eastward, $1\frac{1}{2}$ mile, is that of Abu-el-Jassim or Kassim, who was the son of one of the Imams. There are many other tombs that will not repay description.

The small scale of $\frac{1}{144000}$, on which the survey of Mesopotamia is being taken, precludes the possibility of great detail. It, however, sufficiently answers the purpose, and a larger scale would require a longer time. I am aware of the many imperfections of the sheet which I have completed, but still hope it may be of some small use in helping to elucidate works of valuable information, like the 'Ancient Monarchies' (now being published) by Mr. Rawlinson. I have had no difficulties whatever to contend against in doing this part of the survey, save, perhaps, in eliciting truthful answers to simple questions from the Arabs, who are always too ready to say what they think will be agreeable.

I cannot close this paper without offering my best thanks to Colonel Kemball, the Political Agent of Baghdad, who is always ready to place his knowledge of the country at the disposition of every one.

Baghdad, 1*st May*, 1866.

IX.—*Description of Diarbekr.* By R. J. GARDEN, Esq., F.R.G.S.

Read, April 8, 1867.

THE town of Diarbekr is built upon the right bank of the Tigris, which rises high and precipitously above the river. It is surrounded by walls defended by towers, some of which are rectangular, others semi-circular. They are of various sizes and heights. Some of these are ornamented with sculptured designs of lions, suns, &c., in high relief; likewise with Arabic or

Cufic inscriptions, in very large characters, also in relief. Many of these inscriptions are much worn by time, but the bigotry of the natives is a sad hindrance to getting them copied. A *terre-plein* (*intervallum*) runs all round the outside of the walls; then a low wall, and a ditch beyond, where the nature of the ground allows of it. On the east, or river side, the walls are lower than elsewhere, being built upon the edge of a somewhat precipitous line of rock, the face of which has further been scarped to increase their strength. The walls are in a much better condition in some parts than in others. In many places, however, they begin to show a very dilapidated appearance, and will in a few years either fall down or require extensive repairs. At many points repairs have already been made, which are very plainly seen, especially on the river side, where the underlying rock has crumbled away, bringing down a portion of the masonry. On the inner side these walls are in a ruinous state. That the walls and towers have been erected at different periods is apparent from the fragments of old buildings built into them at localities, and especially parts of the shafts of columns, the circular ends of which are to be seen in several places.* One semicircular tower on the north side is almost entirely constructed of these latter remains; the black volcanic stone of which these columns are made forms a strong contrast with the other and lighter coloured materials. Between the towers are smaller rectangular ones, which, besides acting as defences, served also as buttresses to strengthen the walls. Many of the towers are of great antiquity, as can be seen by the worn appearance of the outer facing of the stones of which they are built. Some of these had formerly buttresses at their bases to increase their strength; these buttresses extended five or six feet on the outer side, and sloped off to a height of from three to five feet above the ground. There were also small posterns at different points along the walls, which are now all built up. Wherever there is a precipice or sloping ground on the outside, the walls are lower than in other places where they are built upon the plain. A broad street runs all round the town between the walls and the houses. This, I presume, was a precaution adopted to facilitate the movements of bodies of troops, and prevent the occupants of the houses committing treason by undermining the walls.

* Seifeddaulah (Quatremère, 'Histoire de Rasshid el din,' Paris, 1836, vol. i., p. 331 *note*), who visited it in 1139, says: "Amida lay on a mountain, three hundred feet high, on the west bank of the Tigris, and quite commanding the stream. The black walls, of mill-stones, with which it is surrounded have not their equal in the world. In Irak each one of these hewn stones as a mill-stone would be worth fifty gold pieces. Within the walls," he adds, "are three springs which drive mills." See Ritter's 'Erdkunde,' Theil x.

The gates are four in number, and are very massive. The Dagh Kapi is on the north, the Rum (Roum) Kapi on the west, the Mardin Kapi on the south, and the Yeni Kapi on the east. There was a fifth, from the citadel to the river on the east side, but it is now built up. On the inside of the Dagh Kapi is a building, now in ruins, in the upper part of which are a number of arched and well-built windows formed of red tiles, with Cufic inscriptions on the walls between them. Externally, and on each side of the gateway, which is lower than that of the other entrances, is a small niche, and in the flanking towers two others; the latter are apparently for sentinels. In the walls on the right-hand tower are some inscriptions; amongst others a Greek one turned upside down, above which are two lions, very rudely executed, like those at Kharput Castle. The left tower is decorated by two sculptured buffaloes, and an eagle, all of which are in a poor style of art. Above, and on one side of the entrance, is a large stone cannon-ball; and on the other a number of iron balls, massed together like a gigantic grape-shot, and fastened to the wall. The towers and walls at the Rum (Roum) gate, leading to Aleppo, facing the westward, are very high, of great strength, and worthy of a visit. With reference to the name of this gate, we read in Gibbon's 'Rome' that the Ottoman monarch was termed the Sultan of Roum. Each tower is well furnished with long narrow loopholes. The gateway is rectangular, with a straight lintel. Immediately above this is a scroll, shaped like the segment of a circle, and, still higher, is an eagle, or hawk, standing upon the horns of the skull of a cow or buffalo, through the nasal extremity of which latter hangs a ring or wreath. This, which is carved in stone, may be emblematical. Above, but extending the whole length of the lintel, is another scroll of Arabic or Cufic. One of these inscriptions bears the date "559 of the Hegira." On the inner side of each gate-post, high up, is carved a band supporting a wreath or ring. The outer gate is made entirely of iron, without any woodwork, and is formed of horizontal and perpendicular bars rivetted to thick plates with large-headed bolts. The intervals between the bars are ornamented with various devices in the same metal, similarly fastened to the plates. The bars, as well as the padlocks for securing the gate when shut, are massive, but very primitive in their construction. Side chambers, or recesses inside the gateway, exist for the accommodation of the gate-keepers. The roof of the gateway is arched, and built of narrow red tiles, and is much higher than those of the others. The inner gate is of wood, strengthened with iron bars. Above the gateway are the remains of some dome-shaped chambers built of red tiles, arranged in an orna-

mental style, but now in a ruinous state. The battlements on the top of the wall are only 2 feet thick; the walls are about 14 feet, although at some points they are less. Through the kindness of Mr. Holmes, the British consul, I am enabled to give the following measurements:—Height of the towers of the Rum (Roum) gate, 65 feet 6 inches; height of the wall between the towers, 52 feet; height of the wall adjoining the towers, 44 feet; breadth of the terre-plein, 19 feet. The towers are large and roomy, and have three stages or stories, the loopholes of which, generally 5 in number, are arched over on the inside with red tiles, and resemble small casemates. The defence of the walls of the town was effected on the land side by two or more loopholes, passages, or stories, built within the thickness of the walls, and extending from tower to tower. Access to these, as well as to the upper battlements, was maintained by flights of stone steps. The banquette running round the summit of the walls was, like that in the citadel of Erzerum, totally devoid of parapet towards the interior of the place, an extraordinary and unaccountable omission.

Between the Rum (Roum) and Mardin gates, the walls take a sweep inwards in the form of a crescent, to clear a ravine, which extends some way up towards them. The Mardin gate is differently built, there being but one immediate flanking tower to the eastward. The entrance, however, is shielded from outward view by a high and strongly built wall, beyond which the ground slopes off precipitously towards the river. The Yeni Kapi, or new gate, was protected by a projecting flanking tower and a wall built along the edge of a precipice; the defences on this side had formerly been further strengthened by an outer gateway and tower, now in ruins. The descent to the river is zigzag, and very steep. The gates are locked every night at sunset, and the keys are taken to the Saray, so that after that hour no traveller can obtain admission until leave has been obtained through his consul from the Pasha.

The view of the town from the top of the Rum (Roum) gate is very good. Numerous mosques are distinctly seen, and the extent of the place is clearly ascertainable. Several ancient but ruined buildings are visible, one having the appearance of a church or monastery, with a portico, is very conspicuous. The mosques are built of different coloured stones in layers; some also are constructed of these materials, but varied with layers of tiles. Water is brought from a long distance to the westward by means of a watercourse covered in, and built of hewn stones cemented together. On nearing the town it flows along an aqueduct about $3\frac{1}{2}$ to 4 feet wide, built of black volcanic stone, and raised on 27 rectangular piers, and as many semicircular arches, by which it is carried through the walls

between the Rum and Dagh gates. Close to this point, inside the town, is a tank about 5 or 6 feet deep containing fish, which are considered sacred, and which is formed by a spring issuing forth from the rock.* This must have been one of those springs which supplied the town in former days, when closely invested by an enemy. Outside the northern and western gates are the ice-pits of the town, the sides of which are of stonework, and slope somewhat inwards. A thick layer of saman, or chaff, is then laid down, on which is piled the ice in the form of a cone, the whole being covered over with a thick coating of chaff, which is said to keep out the air, and to absorb the internal moisture. Access is effected by small steps leading down into the pits, which are generally from 4 to 5 feet deep. The ice collectors are forced by the Government to lay in large supplies, which are sold at moderate rates during the hot weather; otherwise they would limit their stock in order to enhance the value of the article by its scarcity.

Through the kindness of Mr. Maltass, the Chancelier of the Consulate, I succeeded in getting copied a few of the inscriptions on the towers. The following translations by M. Jaba, the Russian consul at Erzerum, a distinguished linguist and numismatist, will give an idea of the probable nature of those not transcribed.

Inscription on a tower near the aqueduct, between the Dagh and Rum gates:—

"In the name of a gracious and merciful God. Our most glorious master the Sultan, the king Saleh, Nedjm-ed-dunya ve-eddin, star of the world and of religion, the head of Islamism and of Mohammedans; Abul-feth Ayub, son of the sultan and of the king of kings; El-Muteali Mohammed, devoted servant of the prince of the faithful; Chedja-ed-din; and before him, Jafer son of Mahmud-el-Halebe, built this edifice in the 634 year of the Hegira." †

Inscription on a tower between the Rum and Mardin gates:—

"In the name of the gracious and merciful God. All power belongeth to God alone. This was done by order of our lord the Sultan, the king Saleh, the wise, the just, the bulwark of victory, the support of the world, Nasser-ed‡ dunya ve-ddin the head of Islamism and Mohammedans, the glory of kings and sultans, king of Emirs, beneficient light of the vast capital of the Khalifs, star of supremacy; Abu-l-feth Mahomed, son of Mohammed Kara-Arshan, son of Soliman; Sokman son of Tunsir, prince of the faithful. May God day by day make his victories more dazzling, and increase his power. May his capital city always prosper; may God shed his blessing upon his country. In the year 605 of the Hegira, this building was constructed by the skilful Ibrahim-el-Halebi whom may the Most High guard to all eternity." §

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* Ammianus Marcellinus mentions this spring.

† Here the king Saleh put the name of Nejm-ed-din, of the family of the Ayubites who reigned in Aleppo, whose supremacy he acknowledged.

‡ It should, I think, be either Nasr-ed-dunya or Nāsir-ed-dunya, &c.

§ The Prince Saleh Mahmud, having to recognise the supremacy of the Ayutes, who reigned in Egypt and Syria, had their name stamped upon the coin and

Inscription on a tower near the Mardin gate, going towards the Rum (Roum) gate:—

"In the name of the gracious and merciful God, who is Almighty.

"By order of our lord the Sultan, the master Saleh, wise, just, protector, warrior, conqueror, the pillar of justice, Nasser-ed-dunya ve-ddin, the centre of Islamism and of Mohammedans, the light of the country, the glory of kings, and sultans, the king of Emirs, the sultan of Diarbekr, of Rum (Roum) and Armenia, the heaven of heavens, the hero of the world, the king of Banitch in Iran, the submission of which had been notified by Kalabeck, Abu-l-feth Mahmud, son of Soliman (Sokman ?), son of Tunsir, prince of the faithful; this building was erected by Behna, son of Ibrahim and Serki, according to the plan which the king Saleh himself supplied." *

These inscriptions belong to Saleh Mahmud, a prince of the dynasty of the Ortokides of Khayfa. This town was called Hesn Khayfa, and known in the time of the Romans by the name of Castrum Cephe.

All these inscriptions were in the Arabic character, but the man who copied them could not exactly explain to what particular towers they belonged.

The citadel is placed at the north-east angle, and has two gates communicating with the town. In it is situated the Saray, a low, common-looking building, in a dilapidated state, in the court-yards of which are two large plane-trees. On each side of the gateway of the Saray are the figures of animals sculptured in relief. Immediately opposite the Saray is a great mound, on which the Sahhebs or Sahibs, the former Mohammedan princes of the country, had their castle, but of which nothing remains but the foundation walls.†

Adjoining the Saray is a high rectangular tower, built of black volcanic stone, to which is attached a small mosque. This tower it is supposed was formerly the belfry of a Christian church. Both outside and inside the courtyard of the mosque are the tombs of several former pashas, as well as of members of their families. The pivot-shaft of the staircase of the tower is rectangular, the ascent being arranged in divisions of three steps, with a landing-place, and so on. The view from the summit of the belfry embraces the whole town.

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on the monumental inscriptions; they also caused public prayers to be offered up in honour of them. This is the reason why the name of Nasser-ed-dunya ve-ddin is mentioned here.

* The Ayubite princes took the title of King of Rum (Roum) and Armenia. Here again occurs the name of Nasser-ed-dunya ve-ddin king of Damascus, whose supremacy Saleh Mahmud acknowledged. Banitch is the name which the province of Azerbijan bore formerly. It would appear that at this period the governor of Azerbijan, by name Kalabek, must have made his submission.

The man who copied the above inscriptions could read the Cufic character, although he took down some in Arabic only; and having left Diarbekr the day he gave them to Mr. Maltass, he could not be sent out again to get some Cufic ones.

† See Ritter's 'Erdkunde,' Theil xi., 1844.

There are about fifty-seven mesjids and jamis (mosques) in the town. A mosque has a mènârè, whereas a mesjid has none. Mr. Maltass and myself visited the Ulu-jami, or Great Mosque, which they say was originally a Christian church.* It has a sloping roof covered with sheets of lead, and on each side of the centre building is a wing, thus forming three separate mosques for three of the four sects of Mohammedans, the names of which I was informed are Hamìfi, Schafè, Malèki, and Hambèli. In the front is a large quadrangle, which is entered from the eastward by an archway, above which are carved figures of lions destroying other animals, but rudely executed. At the inner and opposite extremities of this quadrangle, eastward and westward, is a façade, consisting of a double row of columns, one above the other, and ten in number. The capitals of the lower columns are Corinthian, those of the upper are what I should call Saracenic, possibly Byzantine, but handsomely ornamented. Each section of the shafts of the lower columns is of a different coloured marble. Some of these columns, which are quite plain, have two sections, others three. The shafts of the upper rows of columns appear to be formed of single blocks; and, although not so high as the lower ones, are each ornamented with traceries of a different pattern carved in high relief. Above the capitals of the lower row of columns at the eastern extremity is a border, consisting of bunches of grapes and vine-leaves. The traceries on the walls between the columns have the appearance of being Saracenic or perhaps Byzantine. Arabic or Cufic inscriptions are introduced at different points. In the quadrangle are two Shàdirawāns, built of wood, with conical roofs, covered with sheets of lead.† At the north-west corner is a small mesjid, for the use of the fourth sect (Hambèli) of Mohammedans, although they say that at present there are only three sects here. Eastward of, but close to, the Great Mosque is a large building called the Hassan Pasha khan or caravansaray. It is constructed of layers of white and black stone, which have a good effect.

We next went to the Chaldean church, the bishop of which is a man of education, and speaks Italian. We went into the

* Texier remarks, p. 21, part 3, of his work on Armenia, Persia, and Mesopotamia, that "One of the most curious monuments at Diarbekr (Amida) is the ancient palace which belonged, it is said, to Tigranes, but which Sapor II. occupied. This monument consists of two parallel façades, and of a vast edifice *en rétour*, which has been converted into a mosque. It is to this religious destination that the astonishing preservation of the edifice ought to be attributed. Each of the façades is adorned with two stories of columns of rare and costly marbles, and the sculpture denoted the workmanship of the third and fourth centuries. However, all the arches of the lower story (*rez-de-chaussée*) are *en ogive*, which proves that this kind of construction is more ancient than it is believed to be."

† Shàdirawān is a building where the faithful wash before entering the mosque.

church, which was like an Armenian fane, only somewhat cleaner. On the walls hung several pictures, but were almost undistinguishable from want of light. A priest, who spoke French, said that they had a library in the bishop's house, which contained some old manuscript books. Thence we went to an Armenian chapel, called Surp Gregorio (Saint Gregory). It was formerly called the Kuchuk Kilissè, or Little Church; but having been burnt down about forty years ago, it had been rebuilt on a somewhat larger scale. The walls and pillars supporting the roof were of black volcanic stone. At the time of the fire a number of old manuscripts were also consumed.

As I heard that a wedding was about to take place, I waited to see it. During the ceremony I was accommodated with a seat in an arm-chair inside the altar rails. When the couple appeared at the door, they were kept standing outside, the bridegroom holding the left hand of the bride in his right. He was supported by a male friend, and she by two women, both of whom were desperately plain, and whose duty appeared to be to hold her up—a most necessary proceeding, as she wore on her head a pasteboard cap shaped like an hourglass, over which was thrown a long pink scarf reaching to her feet, and ornamented with tinsel, &c. A kerchief was tied round her forehead and over her eyes. After being kept some time at the porch by a priest, they were allowed to enter, when the two males were each presented with a long rose-coloured gown, which they put on. Here, again, they were delayed some time by a priest, who repeated several prayers, whilst two or three boys inside were distributing short tallow dips to any who would hold them. A lane being formed, a boy commenced beating a metal tambourine. One of the priests—a jolly, though dirty-looking man, with a pair of torn blue shalwars or trowsers and bare feet—took his station on one side and commenced a prayer, to which the tambourine-beater made responses in a screaming voice, and evidently to the full extent of his lungs, varying the noise every now and then by beating and shaking the metal tambourine. In this way the couple advanced at a very slow pace, halting occasionally to allow the priest and his coadjutor to get through their parts, until they reached the altar. Here they were placed in their proper position; the man holding the girl's right hand in his, and their heads bent forward, so that the edge of the pasteboard hourglass-like adornment, upon the head of the bride, touched the forehead of the bridegroom. The priest then bound another kerchief over the eyes of the bride, tying it behind. Having arranged this to his satisfaction, he laid between the two heads a crucifix, which he gave to the bridegroom's friend to hold. Whilst this was going on the tam-

bourine-beater took his station on the raised platform of the altar, screaming out some oration at the top of his voice; after which the officiating priest, attiring himself in a long purple gown, and adorning his head with a gilt crown, surmounted by a Maltese cross, took his place in front of the couple, and read some prayers at a railroad pace out of a book. He was succeeded by a very respectable, clean-looking old man, with a white beard, whom I had noticed on first entering the church. This personage was attired in a long, dark-coloured cloak, with a hood, which he drew over his head. He then read for a few minutes out of a book held for him by an attendant, after which the ceremony was concluded by the couple moving out of the church at the same slow pace as they did on entering, halting every few paces to enable the priests to mumble some prayers. I saw the bridegroom, on first taking his station, put something (doubtless the nuptial ring) on the finger of the bride. He got remarkably pale towards the end of the ceremony, from standing so long in an unpleasant position; and no doubt the bride felt equally uncomfortable. A number of spectators were in the church, and, to show how little respect they had for the place, one woman was knitting stockings.

The parties who were thus married belonged to the poorer class.

The red stratum overlying the rocky substratum, on which Diarbekr was orignally built, now lies about 10 feet beneath the present surface of the ground; so that, to discover any relics of antiquity, it would be necessary to excavate below that depth. The reason of this increase of soil is, that when a house fell or was destroyed, another was built upon its ruins. Some workmen engaged in digging a tank in the garden of the Consulate discovered four walls of stone built in the form of a square; they also found some fragments of a mosaic pavement formed of pieces of different rocks in the neighbourhood and arranged in a bed of cement. These fragments were lying on their sides, thereby showing that the mosaic-work had been disturbed and destroyed at some former period.

The Mohammedans of Diarbekr are considered to be the most fanatical in the country, but it was extraordinary what the presence of our Consul, even during the short space of two years, had effected.* Previously to his arrival European women did not dare to show themselves in the streets, but were compelled to be muffled up in the native manner; and although even now the ladies wear their veils, they are able to appear in bonnets.

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* My visit to Diarbekr was in 1856-7.

With the exception of an occasional visit to the American Missionaries, the ladies of the Consul's family could take no exercise except on horseback, which they generally did when the weather permitted. The appearance on horseback of European ladies occasioned no small curiosity and astonishment among the native women, who had never seen females riding on side-saddles. It was imagined that our Western women had only one leg, the fair equestrians in Turkey being accustomed to ride astride like men. "Come along," one woman was heard to say to another, "and see a lady with only one leg riding on horseback."

One day the Consul's *dragoman* brought his daughter dressed up for us to see. On her head she wore a *fess* or fez, the tassels of which, instead of hanging down loosely, were spread out and sewn down to the front of her cap. On the flat part were sewn three rows of small gold *beshliks* (five-piastre pieces). Round her forehead was tied a coloured kerchief, and over this a *bandeau* with ear-lappets. The *bandeau* was composed of pearls with a centre ornament of pearls, emeralds, and rubies, and, attached to the bottom of it, were loops of small pearls and pendants of emeralds and rubies. Some stones of the latter were also mounted and let in amongst the pearls forming the *bandeau*. The ear-lappets were of pearls with a centre ornament of emeralds and rubies, and edged all round with small gold coins. The strings which fastened the *bandeau* of pearls behind the head hung down in front on each side of the bosom, and were also ornamented with small gold *beshliks*. Her dress consisted of a pair of *shalwars* (Fatima trowsers), a high *chemisette* of muslin embroidered with sprigs of red and green floss-silk, over which was a pelisse of blue-lilac satin with long, full hanging sleeves. The pelisse was edged with gold lace and cord, and cut away in front so as to show the swelling of the bosom and the muslin *chemisette*, and reaching down to the heels, quite concealing the trowsers. Round the waist was a red silk net scarf. Over her pelisse she wore a short jacket of cloth embroidered with gold-thread. Round her neck and hanging down in front were three chains, two of which were of unequal lengths, and were composed of gold coins of different value, both in and out of present circulation. The third chain was the longest, and was made of festoons of pearls and small gold ornaments of open work, manufactured at Diarbekr, to which were attached three charms. The centre one, which hung down below her middle, consisted of a large piece of cornelian or agate enclosed in an ornamental gold case mounted with rubies and emeralds. The other two were of embossed gold. She wore coloured worsted or woollen socks of native manu-

facture. She had left her slippers outside the door. Over her head and shoulders she wore a light-blue net veil spangled with gold-leaf and bordered with a fringe of gold-thread, which was rather weighty. This veil hung down and covered her body. She said the *bandeau* on her head was heavy and made it ache. Her father valued her dress at 15,000 piastres, *beyaz para* (white money), which, at 110 piastres to the 1*l.* sterling, British currency, would amount to about 133*l.* 13s. 4*d.*

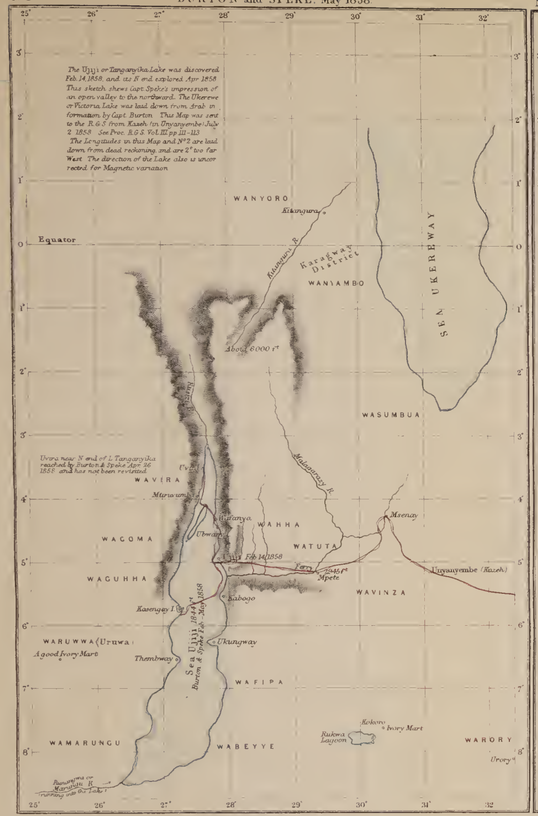
Diarbekr is one of the stations of the American mission. I found three gentlemen of that admirable institution located here, all of whom were married. The members of the church amounted to 39, the general congregation to between 200 and 300. Of these about 60 were women. The school was attended by some 50 boys and girls. These are kept separate. Two native teachers assisted the missionaries. Upon one occasion that I attended their religious services the congregation was very numerous, there being nearly 400 persons present. Several women could read and a few write, and more were learning. Altogether the prospects of success in the missionary field at Diarbekr were very encouraging.

The American missionaries have been sent to the native Christians, and not to the Mohammedans. They have been enjoined—and it is their policy, as well as safety—not to meddle with the latter.

About the month of May, when the heat commences, the rich inhabitants of Diarbekr leave the town and repair to their kiosks or country residences. Their mode of rural life consists in rising very early, when all business and out-door exercises are gone through between the hours of 4 and 9 o'clock A.M. The rest of the day is occupied in reading, writing, or transacting such business as can be carried on within doors, bathing, sleeping, &c. July and August are the most oppressively hot months of the year.

The productions of the *pashalik* of Diarbekr, consist of corn, wax, sesama-seed, cotton, silk, wool, goat's-hair or *tiftik*, gum tragacanth, &c. The sesama-seed is not extensively cultivated here, as it is said that not more than one crop in twenty can be relied upon. It is grown extensively lower down on the borders of the desert, and is greatly used, having no smell, for cooking purposes and lamps instead of fish-oil. The people eat it, and even make sweetmeats with the residue, called *halwa*, which is mixed with honey, &c.

In the vicinity of Diarbekr, on the plains, there are wild pigs, hares, foxes, wolves, jackals, martin-cats, ducks, teal, widgeon, three kinds of partridges (grey, red-legged, and another sort with yellow legs), snipes, woodcocks, sandpipers, and large and


Nº1
BURTON and SPEKE. May 1858
The Ujiji or Tanganyika Lake was discovered Feb 14 1858, and its E and explored Apr 1858
This sketch shews Capt Speke's impression of an open valley to the northward. The Tkerewe or Victoria Lake was laid down from Arab information by Capt Burton. This Map was sent to the R.G.S from Kazeh (on Unyanyembe) July 2 1858 See Proc. R.G.S. Vol. III pp 111-113
The Longitudes in this Map and Nº2 are laid down from dead reckoning and are 2° too far West. The direction of the Lake also is uncorrected for Magnetic variation
Equator
WANYORO
Kikunguru
Kalemeeh R.
KARAGWAH DISTRICT
WANIAMBO
SEN UKEREWAY
Above 6000 ft
WASUMBUA
Urora near N end of L Tanganyika reached by Burton & Speke Apr 16 1858 and has not been revisited
Ujiji
WAVIRA
Mirwanna
Kawanya
WAHHA
WATUTA
Mseuay
WAGOMA
Ujiji Feb 14 1858
Lera
Myete
Unyanyembe (Kazeh)
WAGUHHA
Kaboogo
Kasenguy R
WAVINZA
WARUWWA (Uruwa)
A good Ivory Mart
Ukuruway
Thembway
Sea of Ujiji Lake Tanganyika Burton & Speke Feb 1858
WAFIPA
WAMARUNGU
WABEYYE
Kakoro
Ivory Mart
Rukwa Lagoon
WARORY
Urory
Rumonene or Mamfumbi R.
Mamfumbi or Rumonene R.
Nº2
SPEKE, 1859
This Sketch was brought home by Capt Speke on his return June 1859
Kibuga
Arab furthest point
Kitunguie R.
Kitunguie R. about 3000 yards
WAGANDA
Mwongwezy
18st rivers entered this Plain
KITTARA
KIBIRA WAHAYA
WANYORO
Kitunguie R.
Equator
MOUNTAINS OF THE MOON
Mount Gordon Bath
LAKE NYANZA
Speke Aug 3 1858
Level 3740 ft
VICTORIA NYANZA
WANYAMBO
WATUSI
Mayet
Murury Ivory Port
WAKHANDA
WAZINZA
Bengal Archipelago
Muansa Capt Speke Aug 3 1858
Jordans Nullah
Capt Speke alone reached Muansa on the Victoria L. Aug 3 1858 and returned to Kazeh
The northern part of the Lake and the routes West of it were laid down from Arab information
The Mountains of the Moon as here shewn were drawn by Capt Speke after he had seen the Victoria Nyanza
Ujiji
Uvira
Burton Pk
Mseuay 5000 ft
Kazeh or Unyanyembe 3600 ft
Myete
Mahomedy R
Kaboogo
Kasenguy R
Speke's Runnels
Ukuruway
Thembway
Rangwa
Kawele
LAKE TANGANYIKA
Rukwa Lake Exposed to view with the Tanganyika Lake during the rainy season
Kakoro
Ivory Mart
Rumonene R.
Mamfumbi R.
WAMARUNGU
WABEYYE
WAFIPA
WARORY
Urory
Nº3
SPEKE and GRANT, 1863
Little Luta Nzige Lake about 2200 ft
Karuma Falls
Kamyasi Fidaro
Kamrasi
Mesas
Ripon Falls
Equator
VICTORIA NYANZA
Speke & Grant Feb July 1862
Level 3740 ft 1858
3308 1862
Mahomed Petrowa Arab
Kamrasi
Rubia Lake
Mt Mumbiro
Speke
Grant
RUANDA
Kaiwondo Palace
Kaiwondo
Kaiwondo Ly
Kaiwondo Palace
Kaiwondo Ly
Kaiwondo Palace
Kaiwondo Ly
Kaiwondo Palace

small bustards. In the mountains, bears, several sorts of deer, the ibex, and wild goat. The sport therefore is very good and varied, as the above will show. I went out three times with the Consul, Mr. Holmes, and saw enough to convince me that those who are fond of sport will find plenty of it in this neighbourhood.

The great curse of all these Oriental towns is the filth of the streets. This disgusting feature demonstrates the apathy and indifference of the authorities to the sanitary condition of the town. In some places within the walls the stench arising from deposits of filth is abominable. A traveller would imagine that cleanliness did not form part of the Mohammedan creed, whereas particular stress is laid upon the injunctions with regard to observance of purity and decorum.

X. — *On Dr. Livingstone's last Journey, and the probable Ultimate Sources of the Nile.* By ALEX. GEO. FINDLAY, F.R.G.S.

Read, June 3, 1867.

THE object of these remarks will be to demonstrate, as far as it is possible to do so inferentially, that Dr. Livingstone has reached, or was about to enter, the southern limits of the basin of the Nile when the last painful news of him was forwarded from Africa.

I wish to premise that this conclusion is the result of a long-standing conviction that Lake Tanganyika would some day prove to be the southern reservoir of the Nile. I arrived at this when I was very much engaged with Captains Burton and Speke, in 1859, in discussing and calculating the very copious and most excellent data brought home by their nobly completed expedition of 1856-9. This first East African expedition has had scant justice done to it of late, seeing that it was the first harvest, and that by much the most abundant one, of those brilliant discoveries in Eastern Africa so eminently fostered by the Royal Geographical Society.

No apology is needed for introducing this topic at the present moment, or for considering the last journey of Dr. Livingstone, our noble explorer, to whom so many of us are united by the ties of friendship. The *first* despatch from the interior, which we had been anxiously awaiting, would, I believed, have definitively settled the question I am about to propose.

The points I wish to insist on are these:—

1. That Dr. Livingstone has determined that the Tanganyika Lake has no connexion with the Nyassa Lake:
2. That all known testimony makes the river run *into* the south end of the Tanganyika Lake:
3. That it *must* have an outlet, and that is probably to the north.
4. That the observations of Sir Samuel Baker, as compared with those of Captain Speke, make the Albert Nyanza on the same level with the Tanganyika Lake; and further, that the two lakes join each other:
5. Therefore, the streams which flow north-westward from the mountains at the head of the Nyassa Lake contain the true sources of the Nile.

The following notes will refer exclusively to the physical geography of the region; and in the first place I would advance, as an axiom, that the accounts given by older authors should be judged by the light of recent and positive knowledge, and not be arranged according to the imperfect reports of incompetent travellers, or the vague ideas gained from native report.

Captain R. F. Burton, who should claim the discovery of the Tanganyika Lake, has argued against his first decision, and gives many reasons now for making the lake flow to the northward (see 'Journal Royal Geographical Society,' vol. xxxv., 1865, pp. 1-15). What follows will be supplementary to that, and based chiefly on facts more recently acquired.

I trust that the subject will be made intelligible to the reader by the aid of the diagrams appended to this, which are placed in juxtaposition, and show the different views which have been formed.

To commence with the southernmost portion of our subject. Lake Nyassa, as is well known, was first seen by Dr. Livingstone September 16th, 1859.* He had followed up the important River Shiré to its outlet from the lake. It was afterwards visited by the unfortunate Dr. Roscher, who reached it from Kilwa on November 19th,† two months after Dr. Livingstone had visited it. Dr. Roscher was murdered a short distance from the east shore of the lake in about lat. 12° 40′ s.

The lake is very deep, possibly much exceeding 116 fathoms, and has the deep blue or indigo tint of the Indian Ocean—a

* Dr. Livingstone, 'The Zambesi and its Tributaries,' p. 123.
† Despatch from Lieutenant-Colonel Rigby, July 15, 1866.

sufficient proof of its great depth.* The eastern shore has not been seen, but it is known to be limited on that side by lofty mountains. On the west the beautiful tree-covered heights, probably 4000 to 5000 feet high, are the edges of table-lands, through which flow five rivers, the only affluents on this side. These, with what others enter it from the east and north, will be sufficient to account for the annual rise of the lake (about 3 feet) in January and for the flow of the Shiré.

The northern end of the lake is of the greatest interest in relation to the question now under consideration. It was visited, as is well known, by Dr. Livingstone's expedition a second time in October, 1861. Dr. Livingstone and his party landed near its north-east extreme in lat. 11° 32′, leaving Dr. Kirk and Charles Livingstone in their boat.† The land party struck inland on approaching the foot of the mountains, which rise abruptly from the lake. They encountered a body of the dreaded Mazitu, the effects of whose terrible warfare on the natives had been before observed. The boat party got separated from them for four days, and reached about lat. 11° 20′ s., and saw about 20 miles still further north, or to about lat. 11° s.

The published narrative, and still more the conversations, of Dr. Livingstone and Dr. Kirk lead to the incontrovertible conclusion that no river of considerable magnitude ENTERS the north end of the Nyassa Lake. From the height of at least 1000 feet, over which the land party toiled, the dark mountain masses on both sides of the lake were seen closing in. At this elevation the view extended at least as far as that from the boats; and it was believed the end of the lake lies on the southern borders of 10°, or the northern limits of 11° s. lat. Native testimony, also, whatever weight that may have, confirms this view.

"Mankambira (the chief of the place where Dr. Livingstone landed, within 45 miles of the presumed head of the lake) had never heard of any large river in the north, and even denied its existence altogether; giving us, at the same time, the names of the different halting-places round the head of the lake and the number of days required to reach the coast opposite his village, which corresponded, as nearly as we could judge, with the distance at which we have placed its end." ‡

All other native testimony, too, tends in the same direction. Every native questioned by Drs. Livingstone and Kirk assured them that no large stream entered the lake, but that two small rivers alone enter the lake from the north. Dr. Kirk says that

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* 'The Zambesi and its Tributaries,' pp. 369-371.

† Ibid., p. 381.

‡ Ibid., p. 390.

one of them was named Rovu, meaning "river," and the other a small river coming in from a marsh.*

The settlement of this point in the physical geography of East Africa carries with it the conclusion as to the water-parting of the whole of the river systems between the Zambesi and the Nile. For, should any river fall into the north end of Lake Nyassa, it must be a very large one: draining, as it must do, an area of at least 300,000 square British miles, or a country as large as England and France combined.

Dr. Livingstone's first journeys to the Nyassa Lake, therefore, did all but conclusively determine that Lake Tanganyika has no outlet to the southward.

It has been frequently argued, and especially by Captain Speke, that the Tanganyika Lake drained into the Nyassa. Their relative levels, as far as is known, would admit of such a theory. Dr. Kirk's careful and satisfactory observations, in August to October, 1860, make Lake Nyassa to be 1522 feet above the sea: a much lower elevation than that previously assigned to it, and *at least* 300 feet, and possibly 1300 feet, below Tanganyika Lake.†

Now, as Dr. Livingstone's journey had, for one of its primary objects, the determination of this important point, it may be inferred that his last journey confirmed his previous convictions. We know that he had crossed a marsh, which was found to stretch farther north than he had previously seen, and then continued his journey *westward*. If this marsh had been traversed by the course of a large river, such as the requirements of the case lead to the certain inference, he would have followed up this important feeder to the *northward*, and traced its connexion, if any, with the northern lake, or till its character was really determined.‡

Therefore, I hold it to be a point now settled beyond controversy, that Dr. Livingstone has determined that Lake Nyassa and Lake Tanganyika have no connexion with each other; and by that decision has also determined, in a great measure, where we are to look for the true sources of that still mysterious Nile; for it will be shown that there are all but insuperable diffi-

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* See Dr. Kirk in 'Proceedings,' 1864, vol. vii. p. 261.

† See 'Journal,' 1865, vol. xxxv. pp. 168, 169.

‡ The expedition commanded by Mr. Young determined that Dr. Livingstone passed round the *south* end of Lake Nyassa, instead of to the north of it, as was supposed by Dr. Kirk, and as was fully expected he would do, in order to settle, finally, this important point. This does not affect the problem here proposed. Dr. Livingstone either obtained further knowledge of the north end of the lake on his last journey, or he was so fully convinced, on his previous explorations, that it had no connexion with Tanganyika Lake, that he considered the point as beyond question.

culties in accounting for the drainage of Lake Tanganyika to the Atlantic, through the Congo, on the one hand, or to the Indian Ocean, by the Rufiji or other river, on the other.

Besides this satisfactory evidence of the non-connexion of the Tanganyika with the Nyassa Lake, there is another, quoted by Captain Burton, which may here be repeated. Dr. Kirk says, "Among the few natural specimens preserved by Captain Burton was a small collection of shells from Tanganyika. Dr. Kirk brought some from Nyassa. Between them there is *no community of species,* while both contain many new forms. Among those from Nyassa is one of a type for the first time observed in Africa, and, being large and handsome, it could not easily have been overlooked were it present in Tanganyika. On the other hand, Captain Burton's collection possesses one species common on the Nile, and unknown on the Nyassa." * In the paucity of our knowledge of the lake regions every fact is important towards forming a conclusion, and this one must be added to the other evidence of the non-connexion of the two lakes.

We assume, then, that if it is argued we have no *direct* evidence that this fact is positively determined, that every weight of argument is in favour of such a conclusion.

The SECOND point in our subject is the direction of the streams running south of the Tanganyika Lake.

The distance from the north end of Lake Nyassa to the reported southern part of Lake Tanganyika is about 340 or 350 miles, and the direction is N. 55° W. Of the country immediately intervening we know nothing but from very imperfect native report. About the mountainous country further west we have more information, several important routes having traversed it.

First, from Dr. Livingstone. After having explored the western shore of Lake Nyassa, he started from about its centre in September, 1863, for the west, a period of the year too late to accomplish any great exploration. But he succeeded in determining one very important point—the position of the water-parting of the rivers flowing into Nyassa, and those flowing westward. At his farthest point at Chinangas, in lat. 12° 45′ S., and at 85 miles in direct distance from the lake, he reached the summit of the dividing range; granitic masses lay around it, and in the north appeared a heap of blue mountains.† The elevation is not mentioned, but it must have been considerable, for the piercing winds had an extraordinary effect on his followers, one of whom died from the effect of the air.

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* See 'Journal,' vol. xxxv. pp. 2, 3.

† 'The Zambesi and its Tributaries,' pp. 516, 538.

In their progress westward they heard a good deal from the travelled Babisa and Arabs, who knew the country well, of a small lake called *Bemba*.

"As we proceeded west, we passed over the sources not only of the Loangwa (of the Maravi flowing into the Zambesi) but of another stream called Moitawa or Moitala, which was represented to be the main feeder of Lake Bemba. This would be of little importance, but for the fact that the considerable river Luapula, or Loapula, is said to flow out of Bemba to the westward, and then to spread out into another and much larger lake, named Moero or Moelo. Flowing still farther, the Loapula forms Lake Mofue, or Mofu; and after this it is said to pass the town of Cazembe, bend to the north, and enter Lake Tanganyika."

It is very much to be regretted that this important point was not further examined. The approach of the rainy season and the recall of the expedition caused it to be abandoned, and a hasty return to the Lake Nyassa, and thence to Europe, has closed this interesting topic for the present.

Beyond the point attained by Dr. Livingstone no recent traveller has penetrated; but further to the westward several expeditions have passed from the Portuguese settlements on the Zambesi to within a very few miles of the probable southern end of the Tanganyika Lake. The chief of these are cited, not as novelties, for they have been often quoted, but because the present moment invests them with a stronger interest.

A Portuguese colonist from Goa, Gonçalo Gaetano Pereira,* had sent from Tette more than one trading mission to the Cazembe prior to 1786, and in that year sent his son, Manoel Pereira, in charge of a mission to the same potentate. The accounts given by these enterprising men, as related by Dr. de Lacerda in his preliminary notes to the account of his expedition, contain many geographical features of importance to our present subject.

Manoel Caetano Pereira, the son, started in May, 1786, with his own slaves and the Muizas who had brought down the Cazembe's ivory the year before; and after traversing the land of the Maravi—a term by which the great lake (Nyassa) was then known to geographers—was forty-five days in reaching the Aroangua River, the stream whose head-waters were found by Dr. Livingstone in September, 1863, and then called the Loangwa or Zumbo, the latter name from the place where it falls into the Zambesi 220 miles above Tette. In twenty days more he struck another river, called Zambeze, of which Dr.

* Related in the introduction to Dr. de Lacerda's Narrative, published in the 'Annaes Maritimos,' Lisbon, 1841, &c. I have availed myself of a MS. translation, by Captain Burton, of this important work, now invested with a peculiar interest.

Lacerda says, "From the information of the people I venture to say that it is not our Zambeze, or any of its influents from the Xire (Shiré) river upwards. The Zambeze of the Muizas flows to the *right* hand of those crossing it from Tete, and falls into other streams;" but he makes some confusion afterwards in the lakes into which it runs. "Manoel's party travelled thirty days from the river to the King's capital, crossed some deserts, and spent a day fording a lake waist deep. This body of water is drained by *two* channels, one to the Zambeze, the other to the Murusura River, which passes the royal residence." What follows is almost unintelligible, at least with our present knowledge, but it is directly confirmatory of what Dr. Livingstone has heard so recently.

In the further expedition to the father of the Cazembe chief, Muata-Ya-Novo, to the north-west, the route appears to cross some of the affluents of the Luapula River, which it could be demonstrated, as far as our imperfect knowledge goes, flows to the north-east and east.

By much the most important geographical exploration of this country, next to that of Dr. Livingstone, was that made by order of the Portuguese Government in 1798-9, under Dr. F. J. M. de Lacerda e Almeida, who was no ordinary man. He was a Brazilian by birth, but graduated at Coimbra, where he became a Doctor of Mathematics. He was appointed astronomer to the King of Portugal, and left Lisbon in January, 1780, to lay down the frontier line of the great South American colony. He returned to Lisbon in 1790, and afterwards went to Africa, by royal command, on a mission to the Cazembe.

The important mission of Dr. de Lacerda left Tette for the country of the Cazembe on July 3, 1798. The object of this costly and noble undertaking was, as he tells us, to ascertain if Central Africa contains any mountain capable of sending forth the Cuñene River, which falls into the Atlantic a little below Cabo Negro, and to find a short and easy communication overland from Portugal to the Rios de Sena, and especially to seek the means of bringing these infidels into the bosom of the Church. In the instructions which he issued to his officers, to be followed in case of his own death, he makes especial mention of the "Zambeze," reported by the Pereiras; and directs that if it should flow to the right (that is, *eastward*) they would do well to descend it to ascertain whether it falls into the Shiré, but if to the left or westward, it may be the Cuñene, a river which Dr. de Lacerda had endeavoured, unsuccessfully, to explore in 1798, and then it is to be followed down to its mouth, and thence find their way to Benguella. The same method of

proceeding is laid down with respect to the river flowing past the Cazembe's capital.

Dr. de Lacerda e Almeida was most liberally and honourably treated by the Court of Portugal. He was made governor of the Rios de Sena, in the captaincy of Mozambique, and had a retinue far too large for such an expedition. The second in command was a chaplain, and with him were five other civilians and five military subordinates, five other officers, and fifty men-at-arms as an escort. This large and unmanageable party, with the crowd of negroes and negresses as porters, caused the greatest annoyance to the two leaders, and finally thwarted the chief object of the mission, that of crossing Africa from east to west.

The expedition started, as before stated, on July 3, 1798, and reached the northern Aruangoa River at the end of August; on the 30th they reached the Serra Muchingua, which he named Antonina, in honour of the Prince, fixing astronomically a point about 70 miles south-eastward of it, Mazavamba, in lat. 12° 33′, long. 32° 18′ 15″. This very important position gives us a perfect clue to the course taken by the expedition, and the approximate position of the important Muchingua or Maxinga Range, probably a continuation of that seen by Dr. Livingstone north-west from Lake Nyassa, and which also may be the dividing range of the waters which flow towards the Zambeze on the south and those which pass through the Cazembe's country to the northward. Dr. de Lacerda afterwards speaks of the desolate and rugged country they traversed and the cold they suffered from, which indicates a lofty region.

On September 10th they reached the northern Zambeze River, and here they made some geographical difficulty. I quote Dr. de Lacerda:—

"My principal desire being to obtain exact geographical notes of the size and the direction of all streams crossed between Tete and the Cazembe's country, and from the latter to Angola, I laboured to extract information from different Muize Caffres, and from Manoel Caetano Pereira, making repeated and compared inquiries to avoid errors arising from strange languages. All uniformly and repeatedly assured me that the Zambeze (Chambeze) and the Ruçurue River ran to the RIGHT of one travelling to the Cazembe. Pereira confirmed this information, from which I infer that he does not know his right from his left hand."

Again:

"To-day (Sept. 11, 1798) I sent to inquire about the course of the Zambeze of sundry Mussucumos, a tribe mixed with the Muizas, some vassals of Cazembe (these were my informants) and others independent: *all* said that it trends to the river which runs by the city of the Cazembe,—whatever be the worth of their information, which at present I neither allow nor disallow."

Now nothing can be more circumstantial or direct than this

information, that the rivers (which Gamitto says first flow to the west) ultimately join that running northward past the Cazembe's city—the Luapula or Guapula River.

When this is connected with what is related by Dr. Livingstone, of the streams flowing westward from what is probably the westernmost spur of the great Maxinga Mountains, and which is further confirmed by the undeviating testimony obtained further north, it seems that it would be a perfectly fair inference to state that Dr. Livingstone had seen and crossed the head-waters of one or other of the streams which flow toward the Cazembe country.

The position of the crossing of this northern Zambeze by Dr. de Lacerda is well ascertained, for on September 21st, 1798, eleven days afterwards, he observed an immersion of Jupiter's first satellite, which gave him the longitude of 30° 1′ 45″ E., this was in lat. 10° 20′ 35″, and was his last astronomical observation. The place he calls Mouro Achinto, which Gamitto says was the name of the village chief. When Monteiro was here October 15, 1831, it was called by the name Messire Chirumba.*

Dr. de Lacerda's further journey to the Cazembe's capital is a narrative of his personal sufferings. He passed near to a great lake on his left hand (westward), which has been called Chama; but this was the name of the district (it is also called the Shuia Lake), and reached Lucenda October 3, 1798, worn out with fever and anxiety. Thus died this most excellent man and accomplished traveller. Had his life been spared, we should most probably have had a much more perfect knowledge of the physical geography of this important region. His followers returned to Tette under the guidance of the chaplain.

The next travellers in this region who give any clear account of the country are Major José Manoel Correa Monteiro, as related by his companion Major A. C. P. Gamitto, who went on a mission to the capital of the Cazembe—Lunda or Lucenda, in 1831-2.† Major Gamitto's itinerary is little more than a recital of the rivers and hills they crossed; but few other geographical details are found. This undertaking was set on foot from a similar cause to that of Dr. Lacerda. Towards the close of 1830 a cafila of Cazembes arrived at Tette with ivory for sale.‡ This led the governor of Sena to appoint the above-named officers on

* 'O Muata Cazembe,' p. 196.

† 'O Muata Cazembe, e os povos, &c., da Africa Austral; Diario da Expediçao Portugueza commandada pelo Major Monteiro, e redigido pelo Major A. C. P. Gamitto. Lisboa, 1854.'

‡ 'O Muata Cazembe,' p. xviii.

this embassy. They started June 1, 1831, and followed the same general line of march described by Dr. de Lacerda.

On September 19th they crossed the Serra Muxinga,* called by Dr. de Lacerda Muchingua, and named by him the Cordelheira Antonina. No estimate is given of its height; but it must be exceedingly lofty, for on the second day of their ascent they marched a league, continually ascending to the ridge of the mountain, where the pass was obstructed by an immense rock, like a portal to the defile. The direct route lay through a natural aperture, $2\frac{1}{2}$ feet in diameter, in this rock, or else around it, over a terrible and dangerous precipice. This passed, they came upon a difficult and elevated desert country, where they suffered much from hunger.

On their return they reached the Serra Muxingua on August 10, 1832, and give a longer account of it. It stands as it were alone, rising at once abruptly and very steeply from the table-land, but traverses an immense extent of country. It was estimated to reach an elevation above the sea of a league (Portuguese, or about 19,700 feet). Its head was nearly always enveloped in clouds, but no sign of snow or ice was visible or reported. The height, probably, is exaggerated, but Gamitto says that it is by much the most lofty summit in this part of Africa, and has precipices of a prodigious height. It commands most extensive prospects to the northward.†

On October 9th they reached the River Chambezi, called by the natives Cono, a very rapid stream running to the west, but where afterwards no one knew; but Monteiro thought it might reach the Zambeze.‡ There is nothing, then, in their diary that militates against the results of the much more useful inquiries made by Dr. de Lacerda.

Without following our travellers further, or further alluding to the great lakes they passed, or that of Mofo near to the Cazembe capital, it may be accepted as a general conclusion, from their evidence, that the streams from the north-west of the Lake Nyassa, and northward of the mountainous desert which skirts the Serra Muxinga, run towards the lakes at the Lunda capital, and then, as far as report says, to the north-eastward.§

To these testimonies we must add the more important one of Dr. Livingstone. As before quoted, he had taken great pains to ascertain from the travelled Babisa and Arabs as much as possible about the country in front.

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* 'O Muata Cazembe,' pp. 170–172.

† Ibid., p. 402.

‡ Ibid., p. 447.

§ See 'Proceedings,' 1864, vol. vi. p. 262. Dr. Kirk confirms this—that the Loapula flows north into a small lake.

"There could be no doubt that our informants had been in the country beyond the Cazembe's. The Lualaba is said to flow into the Luapula; and when, for the sake of testing the accuracy of the traveller, it was asserted that all the water of the region round the town of the Cazembe flowed into the Luambadzi, or Luambezi (Zambesi), they remarked, with a smile, 'He says the Loapula flows into the Zambezi—did you ever hear such nonsense?' or words to that effect. Their geographical opinions are now only stated without any further comment than that the itinerary given by the Arabs and others shows that the Luapula is twice crossed on the way to the Cazembe's; and we may add that we have never found any difficulty from the alleged incapacity of the negro to tell which way a river flows."*

Although it is a great trading highway with the Arabs and natives, no European traveller has passed north-eastward of the Cazembe's city.

To carry the argument that the waters flow north-eastward farther, we derive some information from another region, that of Lake Tanganyika.

All recorded testimony acquired from the natives prior to the first East Africa expedition, and information given to Captain Burton, and every pains taken both by that traveller and Captain Speke, while in the country, only lead to one conclusion—that at the south end of Tanganyika Lake a river, the Runangwa or Marungu, runs *into* it; and it is only of late that any theory has made it run out, and so join the Nyassa Lake. There is nothing more certain known now of any particular of the great Tanganyika Lake than was acquired in the first and only visit made to it in February to May, 1858; and as the geographical relation of this great and important body of water to African hydrology rests upon a single and very questionable observation, a few brief, though well known, particulars are here cited.

The first East Africa expedition, sent out by the Royal Geographical Society in October, 1856, was organised and arranged by Captain Burton. He was joined by Captain Speke at Cairo, November, 1856, and finally left Zanzibar for the interior in June, 1857. This fine undertaking was most inadequately subsidized. Only 1000*l.* was supplied by the Government, through the Society, 750*l.* at the outset, and 250*l.* on their return. The rest of the total cost, 2500*l.*, was defrayed jointly by the travellers themselves.

It succeeded beyond expectation, and I think that I am warranted in stating that there never was an expedition based on such limited means, traversing an entirely unknown country, through miseries and difficulties only then first ascertained, which brought to the knowledge of civilized man such a harvest of information on almost every branch of interest. The topography of Captain Speke is wonderfully perfect, considering his

* 'The Zambesi and its Tributaries,' pp. 532, 533.

health and means of observation; and the 29th volume of the Society's Journal contains a masterpiece of descriptive geography.

Delayed, tormented, deserted, and robbed by their escort and party, with health broken by the deadly bilious remittents of the coast region, the travellers struggled on over the high table-land (2500 to 3500 feet) between the coast ranges of the Rufuta and Rubeho Mountains, and reached the settlement of Muskat Arabs at Kazeh in Unyanyembe, where they received a warm welcome. This was on November 7th, 1857, and at the elevation of about 3500 feet. Their well kept journals and observations on this part of the route are perfectly satisfactory.

About this time, I believe, for the record is lost, they broke their trustworthy hypsometrical apparatus, and subsequently had to depend on much less perfect instruments.

They were too long delayed here by sore illness, and before they could start the great rains had set in. Under these most adverse conditions did these brave men struggle on down the pestiferous course of the Malagarazi River. Captain Speke was so affected by the climate and season that he became almost blind, and Captain Burton became partially paralyzed in the extremities, so that he had to be carried in a hammock to the great lake. They reached Ujiji, on the shore of the Tanganyika Lake, then seen for the first time, on February 18th, 1858. A single observation of Captain Speke, with what he described to me as a "bath" thermometer, gave as the elevation of the lake 1844 feet. But this thermometer read 214° instead of 212°, when brought down to the east coast again. Captain Speke's second expedition will perhaps indicate when the index error, which subsequently increased to this great extent, became sensible. There was only one lunar observation taken for the longitude of Ujiji, which point determines the position of the lake, and this was discarded, and the position laid down from dead reckoning; but I believe that it cannot be far wrong. How energetically the intrepid travellers essayed, without success, to reach the north end of the lake, and thus solve the great secret, has been often told.

They had, however, seen what appeared to be the end of the lake, in lat. 3° 8′ s., and the impressions then received were placed on the map No. 1 by Captain Speke.

The general character of Tanganyika Lake, as ascertained by observations and by hearsay, was as follows:—From Ujiji to the north end, as far as was seen, was about 100 geographic miles. Captain Burton estimated, from report, that it was 150 miles from Ujiji to the south end, making it 250 miles in length. Captain Speke's maps extend this considerably. His first

map makes its south end 230 miles from Ujiji, terminating in lat. 8° 30′ s. His second map abridges this to lat. 8° 6′. His first published map reduces it to lat. 7° 45′, like Captain Burton's estimate. This would be within 80 or 100 miles of Lucenda, the Cazembe capital.

It is evidently very deep, but no soundings could be taken. No mention is made, or evidence seen, of any change of level.

The general formation suggests the idea of a volcano of depression, not like the Victoria Nyanza or Ukerewe, a vast reservoir, formed by the drainage of mountains. Judging from the eye, the walls of this basin rise in an almost continuous curtain, rarely waving and infracted, to 2000 or 3000 feet above the water-level. The water appears deliciously sweet and pure. The people, however, who drink it willingly, prefer the water from the little springs on its shores, and also that from Nyanza. It appears to corrode metal and leather.*

The principal rivers were the Malagarazi, which rises in Usinza, and, after a course of about 250 or 260 miles, falls into the eastern side of the lake, 16 miles below Ujiji. The Marungu, or Runangwa, of which mention has been made, and which is about equal in volume to the Malagarazi, enters it from the W.S.W. or south-west at its southernmost extremity, and is almost certainly the same river as the Luapula, which passes north-east of the Cazembe capital.

The third river, which is said to be larger than the Marungu and Malagarazi united, is the Rusizi, at its north end. Until Burton and Speke visited Uvira at its north end, April 26, 1856, all testimony unvaryingly stated that it ran OUT of the lake. Then, and only on this occasion, did they hear, from the sons of the local chief, Marulas, that it ran INTO the lake.† Their lawless crew of unruly Wajiji savages would not allow them to go to it, and thus has the most important question remained a matter for dispute and discussion till the present day.

Upon this information, and upon the supposed depression of the lake below the lands to the northward, Captain Burton argued that it was a still lake, one without an inlet.

In the many conversations I had with Captain Speke on this topic, as well as with Captain Burton, shortly after their return, I endeavoured to combat this view, but being at that time in entire ignorance of the upper course of the White Nile, no solution could be found for what seemed to be then an insuperable difficulty.

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* 'Journal,' vol. xxix., 1859, p. 234, &c.

† See Capt. Burton, in 'Journal,' vol. xxxv., 1865, p. 4.

That an inland sea, of such magnitude, receiving the drainage of such a great extent of country, in a climate where the evaporation bears a large proportion to the rainfall, it is quite incredible that its waters should be FRESH. In the countless ages since its formation, it must have become saline, like the Dead Sea, as an extreme case, or the Caspian as another, or the Shirwa Lake of Dr. Livingstone, the deep waters of which are brackish, and taste like a weak solution of Epsom salts. Every other known lake without an outlet is, I believe, of the same character, saline, and varying in its level.

If this be granted, as I presume must be done by every geographer, there are only three solutions to the problem. First, that it has an outlet to the Indian Ocean south of the route of the two East Africa expeditions; or, secondly, that some river runs to the westward, forming an affluent of the Congo, or other large Atlantic river; or, thirdly, that it drains northward, to which argument these remarks tend.

In the first place, its outlet cannot run towards the Indian Ocean, to the northward of the parallel of its southern end, for that region was perfectly explored by Burton, Speke, and Grant. The Lufigi River, which debouches in lat. 8° 0′ s., has not been examined, but its known character will not admit of such a supposition. Its upper course, known as the Ruaha, traverses the upland desert only in the rainy season, and the space between its occasional sources, and the south end of Tanganyika Lake, is constantly traversed by the Arab caravans passing from Zanzibar towards Lucenda, for ivory, and Kitanda, or Kitata, south of the Cazembe's, for copper. These cross or pass a shallow morass or lake, the Rukwa lagoon, which, at times, joins the Tanganyika Lake. No river is crossed. The Ruaha, whose real sources are still unknown, is not passed. It cannot then run eastward.

The second alternative is that it drains to the westward, or in other words, that it either contains the source of the Congo, whose mouth is 1100 miles from the western shore of the lake, or that the waters flowing westward are finally absorbed by evaporation. To combat these views with the facts at command would lead far beyond the limits of this paper. Suffice it to say, that several routes to the westward of the Tanganyika, not only negative this, but also would almost prove that the waters flow *into* the lake. The great distance will present now the most cogent argument against this, while we have the third, that the Rusizi River is an effluent.

The THIRD point I would insist on is this northern outlet of the lake.

The additional knowledge we now have places this matter in

a very different position to what it was in 1859, and accordingly I now aver that, if our late data be correct, there can be no other solution to the Nile question. I will name the difficulties as they have arisen.

After Burton and Speke had finished their exploration of Tanganyika, and become somewhat improved in health by their stay of nearly three months on the lake, they returned, with means almost exhausted, to Kazeh; and here Captain Speke quite recovered from his partial blindness, and from the effects of a small beetle which penetrated his ear, and suppurated away, completed the rough outline of their route, and forwarded it to England, with the map No. 1, which shows that they conceived that the Tanganyika continued to a valley open to the N.N.W. Captain Speke, leaving Burton to prepare for their return march, then started for the northern or Ukerewe Lake, July 9th, and on August 3rd observed it to be higher than Kazeh, or 3,740 feet. This, also, was an imperfect result, from the defective thermometer. Returning to Kazeh, they collected the remnant of their property, and retraced their steps to the coast.

After having visited the Ukerewe, or Victoria Nyanza, Captain Speke was firmly convinced that this was the true and *only* head of the Nile. That it is one of these reservoirs, no one can doubt. But in order to account for the supposed southern flow of the Ruzizi River, he drew the range of lofty mountains around the head of the lake, and between it and his own Lake Victoria, at a distance of 150 to 170 miles to the northward. These were purely hypothetical, as they were never seen or heard of. Their relation to the first map, sent after their return from Tanganyika, may be seen by reference to sketch No. 2, which is placed on the same parallel on the paper.

The second East Africa expedition, under Captains Speke and Grant, went over precisely the same ground that the first had done, except where crossing the lofty coast ranges. Arrived at the upper plateau, we find that the thermometric observations in the second expedition, as compared with the first, give a lower elevation of about 350 feet, to the country up to within 40 miles of Kazeh, their crucial station, but here the second elevations exceed the first by about 100 feet. It is probable, therefore, that hereabout the instruments in the first expedition began to fail.

It has been objected that these absolute and independent observations by the thermometer involve a fallacy, as the difference of level thus shown must be dependent on the varying pressure of the atmosphere: but to this may be replied that

this region is so near to the equator, that the diurnal or secular variations of the barometer are nearly at a minimum, and that the whole range, except during cyclones or hurricanes, does not exceed a very few tenths of an inch in the mercurial column (each tenth of an inch representing 85 feet of elevation); and that all the observations relating to this point were taken under the same circumstances. Most certainly absolute accuracy must not be demanded for them—at best they can be but approximations.

Captain Speke made the elevation of the north side of his Victoria Nyanza (in his second expedition), to be 432 feet lower than in the first; and between this point and Gondokoro he made FOUR other observations, to which I wish to draw especial attention. The first is near Kamrasi's Palace (Luluga), 2856 feet; the second at the Karuma Falls, 2970 feet; the third, South Luluga, between Karuma Falls and Kamrasi's, 2906 feet; and Paira, 18 miles south of the junction of the Asua River, 1793 feet. (Sir Samuel Baker says that the Nile, issuing from the Albert Nyanza, is navigable as far as this, and therefore they are on the same level.) Finally, Gondokoro was made to be 1298 feet above the sea. Captain Speke's thermometers, I believe, were not brought home, and therefore, their index errors, which were probably considerable, cannot now be ascertained. But they are all relative to each other, and one common correction would apply to all.

Captain Speke heard of the Great Lake, to the westward of Kamrasi's, since explored by Sir Samuel Baker and his lady, and named by him the Albert Nyanza. This lake was also reported to lie in almost the same position by Mr. Petherick, from information given to him by his man Mussaad, who went southward to within four days' march north-west of the north end of the lake. It was also announced by Dr. Peney, May 20th, 1861; he had then got beyond the cataracts of Makedo, and heard of it. His death prevented his exploring it. M. Debono was associated with him.

In addition to this lake, Captain Speke places another, the Rusizi Lake, at the distance of 110 miles due north of the north extremity of the Tanganyika Lake, and connects them by the Rusizi River, which passes through Uzige country. This Rusizi Lake, therefore, lies in the heart of the mountains he inferred to exist in 1858.

The names Ujiji, Rusizi, Uzige, and N'zige, which are placed on this line by Captain Speke, have a great resemblance to each other.

Mr. Consul Petherick reached Gondokoro February 20th,

1863, and made the elevation by thermometer B. P. (three observations) 1265 feet, a remarkable coincidence with those of Captain Speke's—they are identical.*

Mr. Petherick gave a similar thermometer to Sir Samuel Baker, who had arrived at Gondokoro a few days previously; and this also has been returned and tested,† so that its error, and the application of the difference, is not only available for its own results, but will also test and correct those which can be directly connected with it.

Sir Samuel Baker and his lady ascended the rivers on the track which had been descended by Captains Speke and Grant; and with this thermometer of Mr. Casella's he observed the altitude at the four places I have mentioned above as having been observed by Captain Speke. For the sake of comparison they are placed (with Gondokoro) in juxtaposition below; those of Captains Speke and Grant being uncorrected, and those of Sir Samuel Baker, with those final corrections determined on at Kew.

	Speke.		Sir S. Baker.	Difference.
Luluga (Kamrasi's) ..	2856 ft.	Mrooli (do.) ..	4061 ft.	1205 ft.
Karuma Falls	2970	.. .. ..	3966	1026
S. Luluga	2906	.. .. ..	4056	1150
Paira	1793	(R. Nile, near) ..	2720	927
Gondokoro	1298	.. .. ..	1999	701

Mean of the five differences, 1002 ft.

We have thus a clear difference between Captain Speke and Sir Samuel Baker of 1000 feet, at nearly, or quite, the same places. This may seem to be a very large proportion of the entire elevations; but it should be remembered that even in the last one, Gondokoro, it has been thought necessary to add 700 feet to the result obtained by Mr. Petherick with the same instrument.

This difference of 1000 feet must therefore be either *subtracted* from Sir Samuel Baker's elevations or *added* to Captain Speke's; one or the other will prove the point I wish to insist on here.

Not only will this correction regulate the observations made in Captain Speke's second expedition, but it will apply to those made in the first, as the second passed over the same ground.

It has been said above that the second expedition made Kazeh 92 feet, as a mean higher than did the first. Therefore

* Mr. Petherick's observations are given in the 'Journal,' 1865, vol. xxxv., p. 300.

† See 'Journal,' 1866, vol. xxxvi., p. 16, where Sir S. Baker's observations are computed and investigated by Mr. Dunkin.

the observation at Tanganyika must also be brought in, as it was made by the same instrument, placing it at 1844 feet.

Now as Captain Speke's measurements throughout are consistent with each other, if we accept them as correct, it is perfectly possible for Tanganyika Lake at 1844 feet to flow into Gondokoro at 1298 feet, past Paira at 1793 feet elevation.

But then Sir Samuel Baker makes the Albert Nyanza to be elevated 2720 feet. If we take Captain Speke's observations as correct, this must be *reduced* to 1720 feet, identical with Captain Speke's observations at Paira, nearly or quite on the lake-level. Or, what is much more reasonable, we must apply the known correction by Sir Samuel Baker's thermometer to Captain Speke's observation, acknowledged to be imperfect; this will bring Tanganyika Lake up to 2844 feet, or **124** FEET ABOVE THE ALBERT NYANZA.

Either of these views will quite determine the question as to the POSSIBILITY of Lake Tanganyika being connected with the Albert Nyanza.

Without claiming for these hypsometrical observations any refinement—they can be but simple approximations—and putting aside minor differences, it may be broadly stated that these two great western lakes *are on the same level.*

It is not necessary here to apply this reasoning to the stated elevation of the Victoria Nyanza, though of course it must fall into the same category, for no one can doubt but that the waters seen by Captain Speke to flow from the direction of its northern side finally enter the Nile.

Having disposed of the question of elevation, the next point is the geographical position of the lakes. This is most simply met.

Captain Speke heard, in 1861-2, of a lake, the Rusizi, due north of the Tanganyika Lake, and lying between latitudes 1° and 2° s., westward of the lofty Mfumbiro Peak.

Sir Samuel Baker sailed down the north-eastern side of the lake, past its abrupt cliffs of granite and gneiss, rising abruptly from the water to 1200 and 1500 feet high, and heard from King Kamrasi and many natives that it was well known as far as between latitudes 1° and 2° s., when it, turns to the westward, the extent being unknown even to Rumanika, king of Karagwé.

This enormous lake, thus at least 260 miles in length, embosomed in lofty mountains on either hand, extends to and covers the site of the Rusizi Lake, heard of by Captain Speke, and passes over his mountains of 1858.

Who, then, can doubt, if the data we possess be worth anything, but that *they are one and the same lake?*

I therefore claim for Lake Tanganyika, as I did in 1859, when I believe I stood alone, the honour of being the SOUTHERNMOST RESERVOIR OF THE NILE, until some more positive evidence, by actual observation, shall otherwise determine it.

The points, then, which I have endeavoured to prove are: that Dr. Livingstone, by determining the division of the water-flow to the westward of his Nyassa Lake, in September, 1863, had probably reached some of those occasional streamlets which feed the Nile.

That in his last journey, by continuing westward, he had determined that no *large* river entered the north end of the Nyassa Lake, and therefore determined the watershed between the Nile and Zambesi systems.

That all evidence acquired by the Portuguese travellers, read in the light brought to the subject by recent investigation, tends to the certainty of the truth of Burton and Speke's assertion, that the water *enters* the south end of Tanganyika Lake.

That Captain Speke's single observation as to the elevation of that lake is probably erroneous to the extent of the index error showed by his thermometer on the sea-shore, 2°, equal to about 1000 feet, and that otherwise, if Sir S. Baker's observations and information be correct, his Albert Nyanza would flow to the southward, the contrary of which he has proved.

The true sources of the Nile must be looked for in the mountains west and north-west of the Nyassa Lake, or in the great Serra Muchinga of the Portuguese travellers, between latitudes 11° and 12° s.; thus adding 600 miles to the known course of that wonderful river, to which each new discovery adds a new interest.*

The final solution of this most ancient and most interesting problem would indeed be a geographical triumph. I earnestly hope that it may be claimed soon by the Royal Geographical Society, which has done so much to clear away the dark clouds of mystery in which it was enshrouded ten years ago.

But there is another aspect in which the inquiry would place itself in a practical sense, and this to many may be considered of greater importance than the solution of an abstract geographical problem. To what good can such a discovery be applied? A few words will, I think, demonstrate this.

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* The length of the Nile's course from Gondokoro to its mouth, following its major windings, is about 2400 geographic miles (or 2780 British miles). From Gondokoro, near to which, it was generally argued, ten years ago, that the southernmost head of the Nile would be found to the south end of Tanganyika Lake, is 830 geographic miles (or 960 British miles). If the source be near the Muxinga Range, it must be 270 geographic miles (or 312 British miles) still further south, so that its total course will be 3500 geographic, or 4050 British miles —almost unparalleled by any other river.

At present the commerce of the Upper Nile is transported by water as far as Gondokoro, and ceases a few miles above it.

If this branch of the Great Nile be navigable southward from the Makedo or Apuddo Cataracts, down the Albert Lake to its southern end, a distance of 400 miles, and if the Rusizi River be a continuation of it, at the same level, as at present appears, it may extend this navigable part of the Upper Nile for 340 miles further, to the head of the Tanganyika Lake, and to within a few miles of the great African capital of the Cazembe, one of the chief ivory marts, and also near to Kitanga or Kitata, the copper mart.

We should have thus an additional 750 or 800 miles of water-carriage for that commerce which ought to be the best pioneer of civilisation in these otherwise unapproachable regions. A few vessels of shallow draught, impelled by steam or sail, would intercept the whole of the traffic which is now carried on with the greatest vigour between the vast and entirely unknown west, and the infamous slave-depôts on the shores of the Indian Ocean.

As is well known, the chief article of the export trade, ivory, would be nearly worthless in the interior without selling as a slave the porter who brings it to the coast. By diverting this double traffic to the northward, to the Egyptian posts at Gondokoro or elsewhere, we, as a nation, could have very much more influence in repressing the trade in the human portion of it than is now possible at the well-known ports of Mombas, Ibo, Quiloa, and many other notorious places.

If by further exploration it could be determined that such a line of navigation is practicable, and which would be transverse to that now carried on, commercial enterprise, in some form, might soon be established there. This would cut off the slave trade from between the western countries and the coast.

XI.—*Notes on the Russian Harbours on the Coast of Manchuria.*

By Rev. W. V. LLOYD, R.N., F.R.G.S.

(*Read*, June 24, 1867.)

ON the 20th of July, 1866, H.M.S. *Scylla*, Captain Courtenay, left Nagasaki, Japan, with orders to visit the different Russian settlements on the east coast of Manchuria, from the southern boundary of their late acquisition of Chinese territory, the "Tumen" River, to Castries Bay, along the west coast of Sakhalin to the seemingly unsettled boundary (on the 48° parallel of latitude) between them and the Japanese: also the ports of the

Map of the RUSSIAN POSSESSIONS in MANCHURIA

to accompany the paper by Rev.d W.V. Lloyd.

130 135 140 145

55 50 45

Udskoi
Udsk B.
Shantarsk Is
Maya R.
Zeya R.
Ud R.
Torom R.
Tugursk B.
Ulbansk B.
Tudur R.
Sheom R.
Selindja R.
Inkanska R.
Burukansk
St. Elizabeth Pt
St. Mary Pt
Lowenstern Pt
Baikal B.
Klakachev Pt
NIKOLAEVSK
Gulf of Amur
Koam
Ny
Khansan
Taksa
Tchukchagir Lake
Shamagirsk Lake
Amaun R.
Girin R.
Marinsk
Alexandrovsk
Castries B.
Sophisk
Sa
R. Amur
Tintcha
Mylki
Tirida R.
Oskresenskaya
STRAIT OF TARTARY
Bellingshausen Pt
Madka
Patience Bay
Patience Pt
Ny
Traaska L.
Kitosnai
Takoi
Mordvinof B.
Lowenstern Pt
Aniva Bay
Aniva Pt
Meneron I.
Crillon Pt
La Perouse Strait
C. Soya
YESSO
Selindja R.
Inkanska R.
Niman R.
Burei R.
Turma R.
Amur R.
Pashkova
Radeveska
Spaskia
Kaburofka
Polikarpovka
Puzine
Dobraja
R. Amur
Kur R.
R. Dondon
Konstantinovsk
Suffrein B.
Ternai B.
Poir R.
Kur R.
Tolai
Sungari R.
Noro R.
Venikova
Vasiljeva
Usuri R.
San-sin-chen
Bikin R.
Ima R.
Muren R.
Bussera
Akuli R.
Kubirkha R.
L. Dabuka
Khinka Lake
Singachan R.
Situkhu R.
Ninguta
Fudzi R.
Lifulje R.
Gilbert R.
St. Vladimir B.
Olga B.
(P. Sir Michael Seymour)
Dobikhu R.
R. Lefu
Huptu R.
Suifun R.
Shan Alin Mts
Tumen R.
Hun-chun
(Hung-chun)
Novgorodski
Guerin
Vladivostok
Usuri B.
Peter the Great Bay
(Victoria Bay)
Posiette Bay
Frontier Post
Sesuro Pt
SEA OF JAPAN
CHINESE TARTARY
MANCHURIA

English Miles
20 40 60 80 100 200
Geographical Miles
20 40 60 80 100 200

PETER THE GREAT or VICTORIA BAY
on an enlarged Scale

Amur Bay (Guerin Gulf)
Muravief Amursky Promontory
Vladivostok
Golden Horn
(P. May)
East.n Bosphorus
Wilson Pt
Russian I.
Slavianski B. (Port Bruce)
Rynda
Turbina I.
Tiangu-saha I.
Selsky I.
Griden I.
C Cavern
Clarke I.
Red Cliff I.
Putiatin I. (Forsyth I.)
Mayachni I.
Usuri Bay (Napoleon Gulf)
Vostok B.
Nakhodka Harb.
Krainy Pt
America Bay
PETER THE GREAT BAY (Victoria Bay)
Korsakov Is
Astafief Is
C. Gamova
Whale B.
Posiette Bay (D'Anville G.)
Malte Brun Pt
Settlements
Furugelma I.
Sesuro Pt
Expedition B.
Coal Pits
Novgorod Hr
(P. Louis)
Ussuri R.
Chinamini R.
Novogorodski
Ballada
Yedo Rks
R. Tumen

Geographical Miles
5 10 15 20 25 30

43 131 132 133

Published for the Journal of the Royal Geographical Society by J. Murray, Albemarle Str.t, London 1867.

Edw.d Weller

latter on the west coast of Sakhalin below the above parallel of latitude, and in Aniwa Bay.

We left Nagasaki Harbour in a perfect torrent of rain, with a head-wind and sea, under steam; and we were compelled by the thickness of the weather to pass outside the "Goto" Islands. The weather continued thick, with heavy rain, until we reached the latitude of Chosan Harbour in Corea, at the northern exit of the west Corea strait. This harbour was discovered by Broughton in October, 1797. The regular inhabitants number between 6000 and 8000, and occupy four villages at the head of the harbour; but during the fishing season, in autumn, all Corea seems to crowd to the coast in pursuit of the "ribbon" fish. The natives enjoy the reputation of being noisy, dirty, and dexterous thieves, given to them by those who but casually have visited this part of the coast. Upon the female portion of the community seems to devolve the rice cultivation. Either by a treaty right or permission of the Japanese, they resort during the summer months to the island of Tsu-sima, where good wood for ship-building abounds, to build their junks, which, with the exception of a few iron clamps, are wood-fastened, and of unseasoned timber. This part of the coast of Corea is destitute of wood for this purpose.

At Chosan Harbour a colony of about 300 Japanese military men has been established since the time of Taiko-sama; and from all we could learn this seems to be the only result of the latter's conquest or temporary occupation of the south-eastern coast of Corea. No one seems to have heard or seen anything of a Japanese in the neighbourhood of the Tu-men River, or northern portion of the country. The families of these "Jaconin" are left behind on the opposite island of Tsu-sima. The Coreans give a somewhat different account of the nature of this Japanese settlement at Chosan. They admit that they are tributary to the Emperor of China, and that the annual embassy to the court of Pekin are the bearers of the coveted treasures of ginseng and sables, but they stoutly deny a similar relation to the Government of Japan. They, moreover, insist that the Japanese are tributary to their Emperor at Wang-ching (in Corean Séoul, *i. e.*, ching or court), the capital, and that the latter Prince appoints an ambassador to the court of Yeddo on the accession of a new Tycoon. Taiko-sama's boasted conquest is by them construed into a disastrous defeat, the result of which is that, as an evidence or assurance of future pacific relations, hostages to the above number of Japanese are bound by treaty to a perpetual residence at Chosan, where they are as closely watched and restricted in commerce as were the Dutch formerly at Decima.

There evidently exists some doubt as to the position of Wang-ching, Séoul, or King-ki-tao, the capital of Corea. Black's Atlas gives the latter name, which is really that of the province in which it is situated, as the capital, which I believe is rightly placed on the north side of the Han River, which empties itself on the west coast into the Yellow Sea. However, under the heading of Port Lazaref, Oun-gan (Eastern) River, our sailing directions state that Admiral Guérin visited this port in the *Virginie* in 1855; that he found the surrounding country well cultivated and populous, especially at the river's mouth, where there is a large village, believed to be the commercial emporium of Séoul, the capital, which is supposed by the French to be 30 miles inland; a position it is impossible to identify with the "King-ki-tao" of our Atlas. Port Lazaref is in Broughton Bay on the *east* coast of Corea. Tsu-sima is, I expect, the island where the Russians might have been tempted to form a permanent settlement, had it not been for the timely interference of Admiral Hope.

With a fair wind, varying from south-east to south-west, accompanied by occasional heavy fogs up to the 24th, and with fine clear weather on the 25th of July, we anchored opposite the Russian military settlement of *Novogorodski* (Possiette of the Chart), at the entrance of Novogorod Harbour in Expedition Bay. Far away to the south-westward extended the mighty Shan-Alin range of mountains, the cradle of the Manchu conquerors of China, and the home of the present dynasty. The general aspect of the country is a dreary one. As far as the eye could reach in the remote distance there was nothing to meet the view but a succession of hill and dale, green, but devoid of timber; suggestive, however, of the Cheviot Hills and sheep pasturage, or of the west coast of Cornwall and mineral wealth. A Corean hut, surrounded by a rudely-fenced garden, half-a-dozen Tartar ponies, and a couple of cows, might, by diligent observation, be seen here and there, the solitary evidences of a habitable region. Were it not for the dozen log-houses which mark the site of the Russian military settlement, there was nothing to disturb the dream of historic Scythia, and her wild hordes of Tungusian shepherds, roving uncontrolled in search of pasture for their flocks. These few wooden houses, however, mark a great era of change. The khans, the descendants of the great Zingis, no longer rule over this wilderness of verdure. Russia has long coveted, and at last found, on this eastern coast of Manchuria a harbour, where her fleets can pass in and out during the winter season; one perfectly sheltered by surrounding hills, with deep water, an impregnable position, and a good supply of coal. At the base of the northern limit of the Shan-Alin range runs the

Tu-men River, the boundary between Russian Tartary and Corea, as settled by the Russo-Chinese Treaty of the 14th of November, 1860. This southern limit of Russian territory is given in the charts as 4½ miles east of Sisuro Point, lat. 42° 18′ N. The distance of this range of hills from Novogorodski we estimated at 30 miles, and that of the Tu-men River running at the base at about 20 miles. It has been surveyed by the *Actæon's* boats 10 miles from its mouth. The neighbourhood of this river and that of its tributaries is considered the most populous of any on the east coast of Chinese Tartary. The Chinese (Manchu) town of Hung Ch'un (Hun-chun), or "Hwan-chun-ching," 25 miles from the mouth of the Tu-men (or Mia-kiang), with a population variously estimated at from 6000 to 10,000 inhabitants, is within a day's ride on a Tartar pony from Novogorodski. It is conveniently situated at the confluence of the Hun-chun River and the Tu-men, 9 miles to the north, or Chinese side, of the treaty boundary line. It is one of the only two Chinese towns bordering on Corea where the restrictive commercial policy of China permits an interchange of commodities between Corea and Chinese Manchuria. A Chinese mandarin of the second class, with about 300 soldiers, maintains order and levies imposts. The Manchûs repair hither from a great distance to carry on trade. By a short-sighted policy the general trade is restricted to half a day once every two years, and some mandarins only enjoy the privilege to trade annually for five days. The Manchûs supply the Koreans with dogs, cats, pipes, leather, stag-horn, copper, horses, mules, and asses, and receive, in return, baskets, kitchen furniture, rice, corn, furs, paper, mats, swine, oxen, and ponies; the latter highly prized for their swiftness. Hung Ch'un is also famous for its trade in *hai-shay*, a marine sea-weed found in the neighbouring sea. On the Russian side of the line a considerable village or town, of a mixed population of Coreans and Manchûs, fugitives probably from the exactions of their respective mandarins, is located on the River Ching-hing (of the charts), which, from its south-westerly direction from the southern side of Expedition Bay, seems to afford a water-communication with the Tu-men on the south or Russian side of the treaty line.

Since the cession of this portion of Manchuria, Russia has taken complete military possession of the coast, as well as of the right bank of the Usuri and Khinka Lake. Drafts of regiments or of sailors are established every 10 miles along the coast, the men of which are diligently employed in making the great military road which is to connect this settlement with the Amur. The number allotted to Novogorodski is 400 of the 4th Regiment, the head-quarters of which are not far distant. The men,

under a captain (who is commandant of the station), were actively engaged in all kinds of manual labour. They work the coal-mines, load and unload the ships, and were erecting a block-house, store, or residence, for a Hamburg merchant, for which the latter was paying smartly. In fact they seem to exercise a close monopoly of the labour market. There is great difficulty in obtaining the assistance of the few scattered Coreans in the immediate neighbourhood, which, when obtained, is of small account, in consequence of their general disinclination to work at anything. The few Manchûs or Chinese are generally engaged in trade. The soldiery are seemingly European Russians, with light hair and powerful frames; in fact, some of the finest men I have ever seen. They are well clothed, and with a supply of rations so far exceeding their daily wants as to enable them to exchange a portion of the latter for drink at the store. The pay is inconsiderable; report says one rouble (3*s.* 1½*d.*) a year; but as frequent opportunities of pecuniary remuneration are offered by the stringency of the labour market, of which they are generally permitted to avail themselves, the prudent, industrious man may always have the command of money. A merchant assured me that, as a rule, they were better off than the officers, and that several of them had their 500 or 1000 dollars. From a similar source we drew the information that that service in this section of the Government of Eastern Siberia was more lucrative than honourable; that men under either political or social disqualifications were drafted into regiments serving here. The Lieutenant had seen twenty-five years' service, and the sun under every variety of climate. He stated that telegraphic communication had reached the Amur, and that two or three months would suffice to complete the line to this station.

On inquiring whether foreigners were at liberty to settle here or at the other Russian ports along the coast, and whether there was any commercial tariff established by the Government, we were assured that foreigners were at liberty to settle when and where they liked, that an ukase of the Emperor granted and would facilitate the free exploration of minerals, and that Novogorodski was "a free port." But from official quarters we were informed that the vast extent, centralized system, and multitudinous interests, of this vast empire demanded a gradation of references from the lower powers in Siberia to the higher powers at St. Petersburg before legal grants or rights could be secured: this sadly dims the bright visions of the intending explorer or settler. The diligent observer would find it difficult to discover a single godown or a single ounce of marketable stuff, which was not either Russian or for the use of Russian soldiers. Three ships

were, however, in the harbour awaiting cargoes of edible sea-weed, Bêche-de-mer, fried fish, ginseng, &c., for the Che-foo market. Chinese supercargoes were said to be in the interior, on the Tu-men, or some of its tributaries, probably making their necessary arrangements, as far away from mandarins as possible, for a supply. The Coreans on the right bank of the Tu-men are equally averse to mandarin exaction, and doubtless afford every facility to the Chinese merchant from the Shantung promontory in supplying cargo, viâ the Russian frontier, to the conveniently "free port" of Novogorodski. The exactions of the "Tung-pu-en-men," or Corean gate, near the northern bank of the Ta-lu River, about 15 miles from the Chinese town of Feng-Hwa-ching, opened for trade three times a year with the Coreans, must necessarily tend to throw this trade into the hands of merchants or coasters visiting the ports of Russian Tartary and the east coast of Corea. It is not denied that a great deal of the trade of this coast with the Shantung promontory and Che-foo is contraband.

These remarks are sufficient to show that Novogorodski, apart from other considerations, has a very respectable commercial future. This at present seems secondary to the idea of military occupation. At present the houses of the settlement are either baracks or military store-houses. Lines of communication along the seaboard to the east, and by the Usuri and its tributaries to the west, of the Shan-Alin, or coast-range of Russian Tartary, are being gradually opened and perfected; which will not only bring in necessary supplies to, but a more rigorous supervision over, these out-lying stations.

Russia is perfectly alive to the political, naval, military, and commercial importance of the position of Posiette, or, as it is now called, Novogorodski. The Siberian section of the Imperial Russian Geographical Society has issued its report * from Irkutsk as recently as last year (1865), in which

* The Pekin Correspondent of the 'China Express' gives an interesting extract from this report:—"Possiete, but 20 versts from the Corean frontier, is the southernmost gulf of the Russian shore of the Sea of Japan. In it are found what are known now under the names of Pallas Roads, Expedition Bay, and Novogorod Harbour." After which the writer goes on to prove the political, naval, and commercial importance of the gulf.

"I. It borders immediately on Corea, which is independent of China, and on Manchuria, which is virtually independent too. Establishing ourselves here with a firm hold, we practically assert the consolidated possession by Russia of the entire northern shore of the Sea of Japan up to the mouth of the Amoor, ceded already by treaty. Possessing a sufficient force, we might influence Corea, a weak but up to this time inaccessible country, destined in its turn, like other decrepit countries in the East, to yield to Western ideas."

Under the second head the writer goes fully into the advantages of this position from a defensive and aggressive point of view.

"Commercially, it is the only one of our naval stations bordering on a populous

the many advantages of the situation are enlarged upon and duly estimated. It has its future. It is to be the head-quarters of the Manchurian coast. Korsakoff, Governor and Commander-in-Chief of Eastern Siberia, was expected in a few weeks to establish a new order of things, and to give a fresh impetus to Russian progression southwards. The great importance to Russia of this port lies in its being an open harbour nearly all the year round. Last year, or rather winter, there was no ice of sufficient consequence to prevent the ingress and egress of vessels. It is true that it was an exceptional season. Six weeks were stated to be the limit of obstruction by ice in former years to the navigation of the inner harbour. This is an advantage not possessed to the same extent by any other of the many capacious, well-sheltered harbours in the bight of Peter-the-Great, or Victoria Bay; and farther north the harbours are closed to navigation for three, four, and six months. Coal-mines are being worked here: the present demand being small, they are being worked as inexpensively as possible. The only attempt at a labour-saving machine consists of a simple wheel-and-axle apparatus, made of wood, at the mouth of the principal adit and at the head of the shafts, for lifting the water which has accumulated after the late heavy rains. There are three shafts and as many adits; one only seemed to be in working order, opposite to which there was a heap of coal estimated at 100 tons. The depth of this pit was said to be 140 feet. The coal is 3 dollars a ton at the pit's mouth. Our chief engineer pronounced it of a very bituminous character, with a percentage of ash and clinker of 20 per cent; that compared with the Japanese coal at Nagasaki, price 6 dollars, the Novogorodski coal was worth 8 dollars the ton; that it was admirably suited for short voyages, but its free combustion caused so rapid a deposition of soot in the tubes that they soon choked without sweeping; that its use would prove a serious disadvantage and delay on a long steaming voyage. One specimen, analysed by a Russian mineralogist, yielded about 71 per cent. of carbon. This coal will doubtless improve as the mines are farther worked.

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district. On one side, 25 versts from Expedition Bay, stands the Chinese town of Hung Ch'un, with a population of about 20,000; then there are the valleys of the river Hung Ch'un and its affluents, which are also thickly peopled with Chinese. On the other side, on the banks of the Tumen, are seen many large Corean villages, whose inhabitants occupy themselves with agricultural pursuits. By making use of the water communication afforded by the Tumen, commercial influence will spread further and further in that direction, as far as the important inner Manchurian towns of Ningut and Kirin, about 250 versts from Hung Ch'un. We of course shall not delay in developing the navigation of the Tumen." He proposes "powerful small steamers drawing 2 feet, primarily for the use of vessels loading, &c., on Expedition Bay, and in case of necessity for the navigation of the Tumen."—('London and China Express,' May 26, 1866.)

However, we heard that the Russian men-of-war calling here seemed disinclined to use it, if they had a sufficient supply of a better quality to carry them on to their destination. There was a report of exhaustion, and of the difficulties of getting rid of the water; also that Russian men-of-war had entered the port for coal and had not received a sufficient supply to meet their wants; but the general impression is that a better supply of skilled labour and steam-machinery would find all the coal they may need.

To any one capable of appreciating the commercial advantages of the position, the importance of this post cannot be underrated. It seems to possess the peculiar advantage of position and relation to the sea of Japan and the bordering countries which Hongkong holds to the neighbouring provinces of China. It can offer a convenient, free, and secure port, under the protection of a firm, liberal, high-minded Government, under whose ægis, for sound reasons of political economy, if from no higher motive, a refuge may be offered to traders whose business relations otherwise necessarily throw them into the hands of a rapacious set of mandarin officials. The "squeeze" system —tempered and mitigated as it is in China by the neighbourhood of European ports, by foreign consuls, and by intelligent and occasionally highminded Chinese officials—knows nothing of the horrors and cruel expedients of the system as interpreted by the provincial Manchu mandarins in their dealings with the people and tribes south of the Amur. The recent protection of a Russian garrison at Novogorodski has already induced more than three hundred families of Coreans to establish themselves within the Russian line; and the knowledge that the people are beginning to taste the sweets of Russian rule has caused the Corean officials to resort to extreme measures in the punishment of these new converts to "Western ideas," if afterwards caught on the decrepit side of the boundary line. As there are some very convenient harbours farther south, and as we hear something about small steamers, "drawing two feet of water," for the navigation of such forbidden waters as those of the *Upper* Tu-men, it seems almost worth the while of our rulers to direct an occasional peep to be taken into these snug Corean harbours.

Wladivostock, *i. e.* Dominion of the East (Port May), Russian Tartary.

On the 28th July we steamed from Novogorodski, which we left at 4 A.M., and arrived at Wladivostock at 4 P.M. of the same day. The general appearance of the country in this neigh-

bourhood differs widely from that of Novogorodski. Here the mountains or hills, from their summits, down their slopes, and the intervening valleys, are pretty well wooded. The loftier and more distant ranges from the sea-coast are much more so than the hills on the immediate coast. Several exceedingly picturesque bays, with the Homeric names of Paris, Diomed, Ulysses, &c., appear to the right and left as you proceed up to the settlement through the "Eastern Bosphorus" strait, or "Golden Horn," which separates Russian Island from the Mouravieff Amurski promontory. Dismissing from the view the hollow-tree canoes, the odd oars with escutcheon-shaped blades, the Manchu or Oroke fishermen, the rest is not unlike that of English park scenery and country gentlemen's seats. The trees are here and there so isolated as to lend this character to the scene. The sportsman would still further in the early autumn, before the snow falls, realise this first impression, when the woods are well stocked with deer, pheasants, and other game. Tigers and bears but too frequently disenchant this quiet sylvan scene and annoy the scattered proprietors of ponies and oxen by occasionally walking off with them. In winter, hunger drives the tiger from his summer haunts in the Likhota-Alin, or coast-range of mountains, into the few settlements along the coast. One of these animals carried off a pony last winter from the end of the commandant's compound. Another carried off two Russian soldiers. A Russian officer told me that he had taken the skin of one, measuring 10 (marine) feet from his nose to the tip of his tail. These are the veritable Bengal species, and I was surprised to find that he was a constant inhabitant of the country up to 51° N. latitude, and that on predatory excursions to the left bank of the Amur, up to 53° N., he feeds upon the reindeer, seals, and the Delphinapterus. The native Tungusian tribes and Gilyaks hold him in great awe and veneration. One of them killed by a tiger is buried on the spot where his remains are found. The tiger also bears a very leading part in the transmigration of souls, as a vehicle of which his impersonation is typified in the half-beast, half-man idols of "Golde," "Gilyak," and "Oroke" superstitious worship. A Russian officer told me that he had disturbed a very large one making a meal off a fallow deer.

Possiette is entirely dependent upon this port for its supply of wood. There being a good supply of the latter for fuel, no coal-beds have as yet been opened here. Coal is, however, to be seen cropping up out of the surface. Near the sea-coast the trees are somewhat stunted in growth; still we saw some very good-sized oaks, elms, walnuts, and maples, some measuring 3 feet in diameter. At the steam saw-mills we saw some

good white pine, of which there must be a good supply further north; but none were seen growing in the neighbourhood. The soil here is of a very generous nature, and dark in colour. A couple of acres under cultivation yielded a good supply of such English vegetables as turnips, carrots, beets, radishes, onions, cabbages, &c., as well as the coarser kinds of the former for stall-feeding purposes during the winter season. The minimum temperature is, at intervals during the months of January, February, and March, 15° Fahr. to 20° Fahr., during which months the harbour is closed up by ice, and sleighs pass over from one side to the other. Periodical thaws during these months, and that of April, effectually stop communication. As far as the intentions of the Russian Government are concerned, there is every disposition to be liberal to settlers. Land of excellent quality, and not so heavily timbered as to preclude the possibility, where there is a limited supply of labour, of clearing a sufficient quantity for arable and meadow land is freely given. Their own settlers are said to be well fed, clothed, and provided with seed, stock, and necessary implements for two years, with Government officers on the spot to locate and direct, by a necessary superior intelligence, the natural obtusity of the Russian peasant. With the exception of seven foreign merchants, the settlement may be said to be purely military, or composed of soldiers and sailors. The latter are well cared for. They get their 3 lbs. of rye-flour a day and a good supply of leather for their long boots and working gloves. To show that they have an abundant supply, it is not unusual for them to barter their surplus leather and flour for drink. Inebriety seems to be the besetting infirmity of these people. Alcohol is produced from anything containing sugar or starch. As long as it is strong, they do not trouble themselves about quality. The rest of the population is made up of convict or runaway Chinamen and a few Coreans, who are represented as lazy and useless as labourers. They are said to prefer drink to a money payment. They are distinguishable from the other settlers by their small piercing dark eyes and regular features. Their style of head-dress is remarkable,—a tuft of hair standing erect, like a horn, in a line with the forehead and at right-angles to the top of the head. It is a mode of wearing the hair the very opposite to that adopted by the Japanese: the latter shaves the front of the forehead and down the centre of the head, leaving a tuft at the *back* of the head, which he bandolines and fastens into a flat position on the top of the head; but the Corean shaves the back of his head down the centre of the head to the forehead, leaving a tuft erect on the *front* of the head.

Compared with Novogorodski (Possiette), Wladivostock (Port

May) may be said to be flourishing. The houses are more numerous, and, although still built of logs, are more substantial, roomy, and approaching the "genteel residence." The hotel is capacious, but mal-administration in the supply of the table, descending to common necessaries, has left it untenanted and in a state of hopefulness for better days. It has its church and "Papa" of the Greek Church.

The harbour is capacious, free from obstructions, of convenient depth of water, and perfectly protected by surrounding hills gently sloping down to the water's edge, and affording a good natural drainage for any future town springing up on the site of the settlement. The general impression, or perhaps the wish of the few merchants here, is that although Novogorodski, from its better strategical position and comparative freedom from ice in winter, may be selected as the head-quarters of the east coast, Wladivostock must be the commercial port. Without adopting this opinion, it may be said that it has an abundance of wood for building purposes and winter fuel, which to poor settlers in a rigorous climate is an important consideration, and an advantage which it possesses over Novogorodski, which has scarcely a tree. It is also nearer the great centre of communication (the Khinka Lake and Usuri River) with the Russian provinces on the Amur. This lake empties itself by the Sungachan at the confluence of the latter with the Dobikhu, or eastern branch of the Usuri, into the latter river, by which there is steam communication with the Amur to Kabarofka. The nearest practicable route from Wladivostock to the point where steam communication commences is 300 versts, or 200 miles. The river Suifun, at the head of Guérin Gulf, a distance of about 15 to 20 miles from Wladivostock, ascends and is navigable for good-sized boats to within 40 miles of the Lefu River, which latter empties itself into the Khinka Lake. The Ma-hai River, at the head of Usuri (Napoleon) Bay —which, by a land-carriage between it and the Dobikhu, connects with the Usuri—is not considered so practicable as the route by the Suifun, in consequence of the shallowness and rapidity of the Dobikhu. A Russian engineer (*ingénieur des mines*) officer informed me that the neighbourhood of Khinka Lake was rich in minerals. Gold, silver, platinum, lead, and coal were to be found there. The Manchûs frequently bring small parcels of gold of fine quality to this settlement for sale, but they overrate the market value of the precious metal too much to enable the merchants to purchase much of it. Fine prairie lands are said to lie by the lake and beyond the mountains, where some Swiss emigrants propose settling when satisfactory arrangements can be made with the Russian Government.

The topographical engineer of the district, who took passage

with us to Nakhodka Harbour, informed us that he had accomplished the journey to Kabarofka, at the mouth of the Usuri, in ten days. Subjoined are some interesting particulars of his journey from Nicholayevsk to St. Petersburg, on a leave of six months only, to visit his family. He left Nicholayevsk by a steamer, drawing 4 feet, for Aigun. Thence by a steamer, drawing 2 feet, to the Shelka River, to Nerchensk or Streytinsk, where his journey by steamer ceased. Thence he journeyed by the Lake Baikal to Irkutsk, where he awaited good sleighing. Thence by road and rail to St. Petersburg. The cost of the journey there and back was about 1000 rubles, or 160*l.* sterling. Having limited means, he exercised strict economy. There are pecuniary advantages, it appears connected with service on the Amur and east coast of Manchuria. He mentioned double pay. Service for ten years secures a pension in rubles, amounting to about 120*l.* per annum, which is doubled for every further ten years' service. Starting from Nicholayevsk in September, the journey can be accomplished to Irkutsk in one month, and from the latter place to St. Petersburg in twenty-five days. This is of course by continuous travelling, say in round numbers a distance of 8000 miles.

Chita, a town on the Ingoda, in the spring of the year may be considered the head of the navigation of the Amur. It is 2260 miles from Nikolayevsk. At other seasons it stops 250 miles short of Chita, at Streytinsk, which is 730 miles from Irkutsk. The steamer ascends in thirty days and descends in twenty days. Those who have a fancy for a boat journey, it seems, can ascend to the head of navigation in one hundred days and descend in fifty. Telegraphic communication is established between St. Petersburg, through Kabarofka to Nicholayevsk. From Kabarofka the line is in such a state of completion, that it may be expected to reach Novogorodski in two or three months. These progressive changes are due to the enlightened policy and quick sagacity of General Mouravieff, the late Governor-General and Commander-in-Chief of Eastern Siberia. For his wonderful success in carrying out the encroaching policy of Russia on the Amur, and its important tributary the Usuri, and his stealthy but rapid acquisition of the seaboard to the Tu-men, he has well deserved the gratitude of his country. By a peaceful triumph of the pen and a high order of diplomatic intelligence, he has well earned the recognition of his Emperor, in his title of Count Amurski, his membership of the Council of State, his grand cross of the order of St. Vladimir, and his pension of 10,000 rubles (1600*l.*).

A notice of Wladivostock would be very imperfect without a passing reference to its neighbouring lines of communication

viâ the Suifun River in Guérin Gulf, the head-waters of the Usuri, and Khinka Lake, with the interior of Russian and Chinese Manchuria. The *Esmerod*, a large-sized Russian gunboat, recently arrived at Hakodaté, after a visit, with the Governor-General of Eastern Siberia, to the southern ports recently visited by the *Scylla*. She had left the Governor-General at Wladivostock. His intention was to return to Nicolayevsk *viâ* the Suifun, Lefu, Lake Khinka, and the Sungachan or western branch of the Usuri. This selection of Wladivostock as his port of debarcation, combined with the information I have received from Russian officers who have travelled over and assisted in the survey of this route, unmistakably mark it as that of the southern ports best suited for inland communication. The Usuri is next to the Sungari, in Chinese Manchuria, the most considerable tributary which the Amur receives from the south. The exploration by the Russians of this important river first took place in 1858, as a preliminary step to the occupation. Lieutenant Veniukof, its explorer, ascended it nearly to its source, and then crossed the coast range, coming up the Gulf of Tartary, a little north of Port Wladimir. A more exact survey of the whole region, extending between the Usuri and the sea, and south to the frontiers of Corea, was made in 1859, in pursuance of Art. 9 (on definition of boundaries) of the Treaty of Tientsin (13th June, 1858, ratified at St. Petersburg 10th September, ratifications exchanged 24th April, 1859). Colonel Budogorsky directed this surveying expedition, which worked in three sections, each composed of an officer and nine assistants. A map, showing the results of these surveys, has been published by the Russian Topographical office.

Usultsof determined seven astronomical positions east of the Usuri. The Cossack officer, Dareyitairof, explored the Suifun, and its tributary, the Huptu; and Captain Gamof, of the Topographical corps, especially detached on that service from St. Petersburg, furnished nine astronomical positions along the Amur and twenty along the Usuri and its tributaries up to Lake Khinka. He also ascertained barometrically the altitude of several mountains, and made a valuable collection of plants and animals.

The sources of the Usuri are in 44° N. latitude, and the development of the river, from its origin to its mouth, is 497 miles. But, to follow the route of General Korsakof: we ascend the navigable portion of the Suifun, we reach the coast range or Likhota-Alin of the Chinese. This range may be considered an offshoot of the Shan-Alin mountains in the south. The crest of the range varies in distance from 25 to 80 miles from the coast. The eastern slope drains into the Gulf of Tartary and

the Japanese Sea; the western into the Usuri. The rivers entering the sea have but a short course, and are navigable only near the mouth. These mountains attain an elevation of from 4000 to 6000 feet. The southern passes are the only ones of real importance, the others being too long and difficult. A portage intervenes between the navigable portion of the Suifun and that of the Lefu. Descending the latter, which has now or is shortly to have a small steamer plying upon it, we arrive at Lake Khinka. This lake extends between 44° 36′ and 45° N. latitude, and is about 60 miles long by 40 wide. The north-east and north-west shores of the lake are level, and swampy tracts extend at the mouth of the rivulets which enter it, and of which the Lefu is the largest. The lake abounds in fish. Its oddest fish is the "Iluam-yu," unknown in Europe. We are indebted for a knowledge of its existence to the Roman Catholic missionary, De la Brunière, slaughtered by the Gilyacks on his arrival at the mouth of the Amur. He tells us that he has seen them of 1000 lbs., and had heard of others weighing from 1800 to 2000 lbs. "White, tender, and entirely cartilaginous, with the exception of three small bones on the neck; it has lips formed like those of a shark, the upper protruding much over the lower. Like the shark, it turns itself to seize its prey or bite the hook, and, like it, swims slowly and clumsily. The cartilage and bones are the most esteemed portion of the fish, and sell at Lansin (on the 'Sungari') for one and a half taels of silver per lb. The mandarins annually lay in a supply for the Emperor's table."

The mountains near the lake are rich in game. About ten villages are dispersed along the shore, and among the inhabitants are five Goldi families, the southernmost representatives of this tribe. A sandy strip of low land separates Khinka Lake from the smaller Dabuka Lake, lying within the same basin. Roads lead hence to Ninguta, Girin, Hung-Ch'un, and to a town (unknown to my topographical friend, Colonel Budichtchef) called Furden, on the Suifun. M. Butzow, his Imperial Russian Majesty's Consul and Diplomatic Agent at Hakodaté, was on Mouravieff's staff; and one of a party that accompanied Admiral Kazakavick to Lake Khinka in the small steamer *Mecanie*, 15-horse-power. She was built at Nicolayevsk, the machinery having been made at Petrovsk, on the west slope of the Yablonai mountains. She had run aground in the Usuri in the previous year. It was on the occasion of meeting the Chinese Boundary Commissioners by appointment at Lake Khinka on the 30th May, 1861. She numbered amongst her passengers Colonel Budogorski and his forty-five Cossacks. The whole

course of the Usuri and the shores of Lake Khinka have ever since been occupied by Cossack stations.

The eastern branch of the Usuri (or Sundugu) being hemmed in by mountains on both banks, and having a very rapid course, does not present equal facilities for steam communication. A tributary of this branch, the Dobikhu, is remarkable on account of gold being found along its course. The Chinese obtain gold here, which they smuggle into and sell in China and Corea, unknown to the mandarins at Hung Ch'un, the frontier town. In addition to the ordinary jealousy shown by the Pekin Government at any attempt to explore for precious metals, they have the absurd idea that it is indecorous to disturb the earth upon which were born the celebrated ancestors of the reigning dynasty. The fact, however, that the Chinese find the gold in the river, and not in mines, would, it is to be feared, be a vain plea should they once entrust their golden acquisitions to the rapacious scrutiny of the Chinese Custom-house officials at Hung-Ch'un. Below the "Vongo," another eastern tributary, the mountains disappear on the left and approach the right of the Sungachun. After the "Muren" joins the latter the river becomes very tortuous. Though it is not very wide it carries a large body of water, and, flowing in one bed, offers no obstacles to navigation. The formation of small inlets and creeks is peculiar to this part of the river. The average breadth of the Usuri is here 230 yards, at times only 160; but the depth from the low-water level is from 7 to 9 feet. The country between the Sungachan and Kubur-Khan is, in most cases, well adapted for settlements. Low hills are scattered over the plain, and in the neighbourhood of the Kubur-Khan high hills approach close to the banks of the Usuri. They are wooded with oak, and would well repay gardening and agriculture. In the forests vines and walnuts abound. Conifers have not as yet been met with. Up to this point or section of the Upper Usuri, of which Wladivostock may be called the natural outlet or port seaward, the agricultural prospects of settlers are somewhat encouraging. There are, however, two very important drawbacks, viz., scarcity of population to supply labour, severity and duration of the winter season. Veniukof, the Russian explorer, and others, give us 1400 as an estimate of the whole population on the Usuri, of whom about 400 are on the left bank or China side of the river. The vast tract extending between the Usuri and the sea-coast, from Castries Bay, on the north, to the frontier of Corea, is very thinly populated, and it is only in the south, where there are several Chinese settlements, that the population is compara-

tively numerous. A fair estimate of the population of the whole coast region may be set down at 2500.

The severity of the winter season on the Upper Usuri, although a great, is not an insuperable obstacle to agricultural pursuits. The same, or but slightly ameliorated, climatic conditions afford profitable results to our agricultural settlers in the British North-American possessions. The flattering aspect of the summer vegetation we beheld on the neighbouring coast must not, however, lead us to ignore the abnegation and endurance necessary to the winter resident in these latitudes. Mr. Maximowicz has made some meteorological observations on the Upper Usuri, at Bussera, 6 miles below the Sungachan, of which the following is a *resumé*:—

"In the sun it thawed from the middle of March, and the snow disappeared in many parts; but only on the 20th of that month did the minimum thermometer rise above freezing point in the shade. During the nights severe frosts occurred until the 12th of April. The river opened on the 15th of April, and the last frost observed during the night occurred on the 9th of May. On the other hand, the temperature at noon was occasionally very high. On the 30th March, for instance, 56° Fahr.; on the 17th April, 74°; and on the 13th May, above 80° in the shade. The last snow fell on the 4th of May, the first rain on the 28th of April."

The present defences of Wladivostock comprise a detachment of 300 to 400 soldiers, 30 or 40 sailors, and 10 field-pieces, with the necessary horses. From each of the stations soldiers are detached, during the summer months, for work on the roads and the telegraph line. Sea-going canoes drawn up on the beach represented the commercial aspirations of the port. They had recently deposited their store of "Comboo," seaweed of a brown rusty colour, about seven feet long, and done up in compact bundles; also of "bêche-de-mer," strung on sticks. These were to form part of the cargo of the *Alexandria* (a schooner that we had left behind us in the outer harbour of Possiette), doing a quiet trade between the Shantung promontory and this coast.

Nakhodka.

On Monday, the 30th July, it was our intention to have left Wladivostock (Port May) at daylight, but one of the dense fogs, which during the summer months seriously interfere with the navigation of the coast of Tartary, prevented our leaving at the hour we had proposed. At about twelve o'clock, however, the fog lifted, and enabled us, with little farther interruption, to anchor for the night off the west side of the island of Putiatin (Forsyth). This island, in one of the many beautiful bays which indent this part of the coast, forms with the latter

a crescent-shaped or semi-circular harbour, where deep water and the protection of hills gave us every possible security. At daybreak of the 31st we steamed out and reached Nakhodka Bay, a distance of about 30 miles, at about 10·30 A.M. Here we landed our Russian fellow traveller, M. Budichtchef, a topographical engineer officer in the Russian service, who was returning to his duties here after a short absence at Wladivostock, where he had been to consult the regimental surgeon. His solitary block-house was seen at the head of the bay,—the only sign, with the exception of a Chinese Manchu fishing-hut, of human habitation. The situation, or rather that of its immediate neighbourhood, was worthy of a higher effort of human art. Nature in her happiest moments could scarcely have conceived a fairer creation of scenic beauty, and seems in this beautiful harbour to have suggested the idea, or modelled the plan of the artistic park-scenery of our best landscape gardeners. Chiswicks and Blenheims, in all but ducal wealth, architectural effect, and historic association, seemed scattered broadcast over the diversified scene of hill and dale around. Not "the horn of the hunter," but the matchlock of the Tartar was heard in the glen in chase of the deer; a hind-quarter of one of which, full of flavour and tenderness, lent an extra charm to our visit. To a sportsman it is easy to suppose that time might be pleasantly occupied here. The four Russian soldiers, the hut companions of our friend the topographer, have spent three years here, and are so prepossessed with the place that they have sought an extension of residence. Our friend, speaking of his soldier companions, mentioned as a singular mark of good fortune that only one of the three was "*ivrogne.*" What the future of such a scene may be, must depend upon the resources which the vast Government of Russia may be able to apply to its colonisation. With settlers, the opportunities of an accession of agricultural and mineral wealth are undoubtedly great, but in the absence of labour one can but hope and admire. The half-dozen Manchûs, or vagrant Chinese, the lords of the untold acres of pasture and wood land around, have an abundance of fish and game to satisfy their necessary wants. Our dollars failed to secure some eggs, fowl, venison, dried fish, &c., that a boat brought off to the ship. Our already well supplied larder, enabled us, however, to dispense with them. We were rather amused to find the native intelligence fully alive to the commercial interchangeable value of the ubiquitous dollar, and the Shanghai market quotations for sea-weed, bêche-de-mer, dried fish, etc. Itinerant Chinese traders periodically visit the place for the purchase of the latter commodities, or their exchange for native luxuries and wants.

It is strange that with cows, and an abundance of milk, in a decidedly pastoral country like Eastern Siberia, butter should not be made in the province. The Russian peasant's ignorance of the profitable treatment of cattle, and his general unwillingness to depart from the rude and wretched makeshifts of his forefathers, thus deprive his countrymen of one of their most coveted luxuries.

It may be important to remember that the harbour of Nakhodka is frozen over for six weeks, and that the golden visions of July must not be expected to be realised throughout the year.

Olga Bay (Port Sir M. Seymour).

On Saturday, the 4th of August, we steamed to the outer harbour of Olga Bay, after spending four days under sail on our passage from Nakhodka Harbour, a distance of about 120 miles.

This is another of the many beautiful harbours that fringe the coast of Russian Manchuria. It is formed of an outer and inner, or as it is called the "careening" harbour, within which lies the settlement. The outer harbour is said to be open throughout the year. It is open to the southward, but is otherwise sheltered by a circle of gently sloping hills, thinly wooded with oaks, maples, birch, ash, aspens, and occasional willows, which, compared with the forest-trees of the more southern harbours, bear a stunted appearance, hereby indicating an increased severity of the climate. The minimum thermometer gives —20° Fahr., whereas at Wladivostock it is —10° Fahr., and at Possiette —5° Fahr., according to local accounts. The inner or careening harbour is perfectly landlocked; and as it receives from its head the contents of a small river, is closed by the ice for four months. The hull of one solitary brig was the only outward indication of commerce. At the landing-place is a wooden jetty. At the land end are a couple of block-house stores, some scales and weights. A ragged sailor, with a rusty musket and bayonet, made a very unmilitary attempt at a salute as we landed. The guard here is limited to thirteen sailors; and the commandant expressed his regret that the want of a boat and boat's crew prevented his returning our official call of the morning.

The station of Olga Bay does not evince the slightest military proclivity. It is true that there is a commandant, a naval lieutenant, a second lieutenant, and a doctor, in whose hands, it is presumed, lies the administration of Russian rule; but in reality they merely constitute a superintendance over a colony of 300 emigrants, peaceful, unimaginative Finnish or Lappish

peasants, their wives, and children. The *Mangur*, the transport that brought them to their future home, was at Shanghai in December, 1863. The colony is therefore a young one. They are located in four small villages, at the respective distances of 1, 4, 7, and 10 versts from the bay. No. 1 we visited, and we have everything to say in commendation of the fostering care of the paternal government of Russia, and of its desire to settle its newly acquired territory in eastern Manchuria. I think that it has already been remarked that the Government supplies the emigrant with house, land, food, clothing, cattle, seed, farming utensils, and last, but not least, with religious teaching and medical treatment. These substantial provisions are made for the first two years; and, should unforeseen circumstances disappoint the aim of liberal intention, the emigrant is not permitted to want the necessaries of life. A broad roadway was lined with twenty substantially-built log-houses, withth atched roofs and glass windows. Comely matrons, in the costume of the Baltic shores, flaxen-haired children—the wonder, and perhaps envy, of the dusky little Tungusians around them—ran out to the doors, or peeped through the windows as we passed by. Cows of superior breed, fat-tailed sheep, pigs, horses, poultry, surrounded their dwellings. Small garden-plots, surrounded by a protecting fence of cleft ash, birch, or oak, were remarkable for their red and white poppies, beds of sweet peas in blossom. Good potatoes, lettuces, and ordinary English vegetables seemed to thrive very well. The situation seemed admirably selected, on the gently sloping incline to the river at the head of the bay. In fact, the enterprising settler has little to mar his prospects of success, but such as are incidental to a long winter, and no more of this than the Lower Canadian farmer has to contend with. Instead of dense forest and the labours of the woodman's axe before settlements can be cropped, we have here open plains and sparsely wooded slopes, so thinly wooded that no man could lie there under the ordinary spring sun and mid-day temperature of this latitude. About fifty or sixty acres of arable land, totally disproportionate to the industrial capabilities and wants of the number of settlers, were indifferently cropped with rye, barley, or bearded wheat, oats, buck-wheat, and potatoes. On primeval soil, decidedly rich, better results might be expected; but the Russian farmer appears a slow creature, and devoid of industry. Old customs, drunken bouts, primitive ideas, clumsy inefficient implements, and the weeds of a rank soil stop the way of all agricultural improvement. We visited a Chinese farm, or fenced enclosure of about a dozen acres, with similar, but certainly better cultivated, crops. These wonderful, ubiquitous Chinese may not govern, but they contrive to possess anything

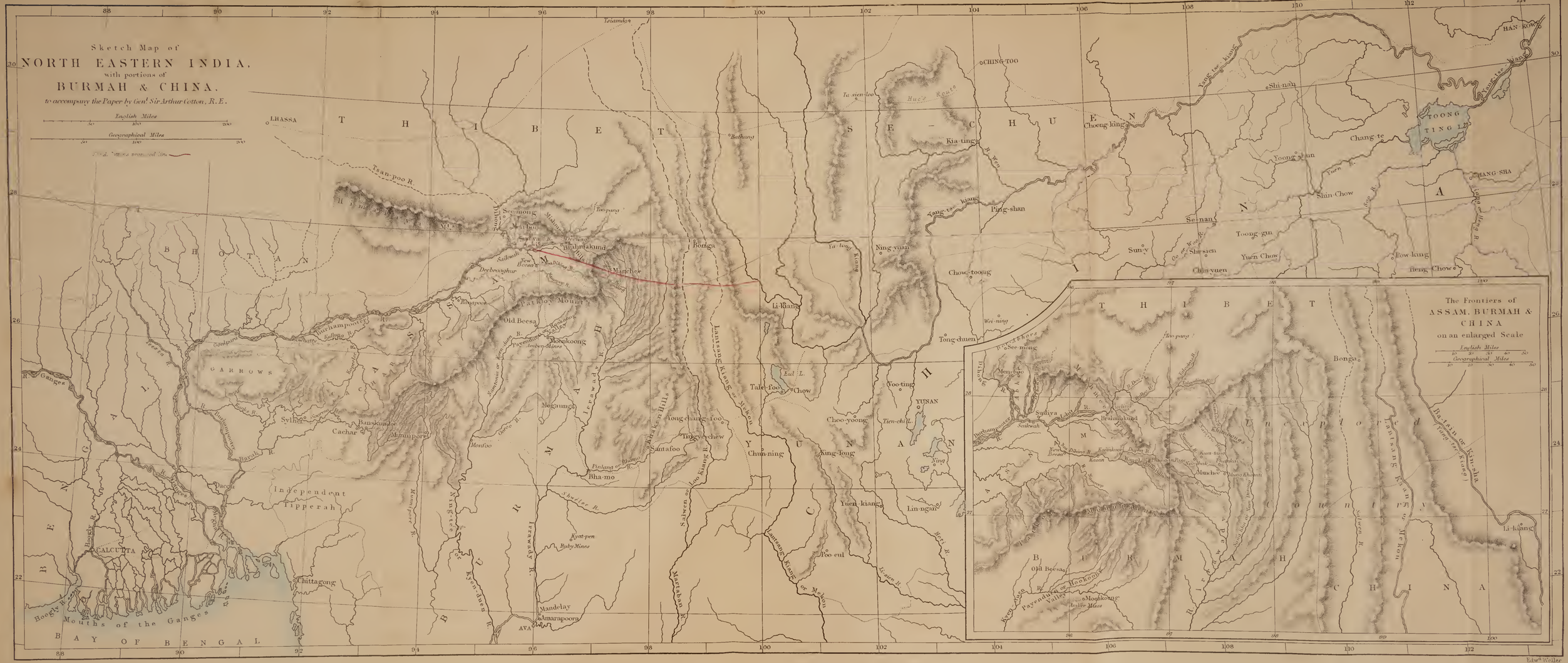
Sketch Map of NORTH EASTERN INDIA, with portions of BURMAH & CHINA.

to accompany the Paper by Gen.l Sir Arthur Cotton, R.E.

English Miles 0 50 100 200

Geographical Miles 0 50 100 200

Red line proposed Rly.



The Frontiers of ASSAM, BURMAH & CHINA on an enlarged Scale

English Miles 0 10 20 30 40 50

Geographical Miles 0 10 20 30 40 50

Published for the Journal of the Royal Geographical Society by J. Murray, Albemarle Street, London, 1867.

worth having in the country of their conquerors. The Manchûs may govern China; but the Chinese own Manchuria, and the thorough-bred Manchu, the ancient lord of the soil, has been successfully cozened out of his patrimony. There remain but his rank and privileges of birthright, declined by the practical Chinaman, which consist in serving the Emperor either within the fortified cities of the empire, or amidst the eight banners beyond the Great Wall. A nomadic Manchu Tartar horde, south of the Amur, would be an ethnological prize.

Purchases were made of sheep at nine dollars apiece, fowls three for a dollar; eggs and milk seemed abundant.

Communication with the Usuri is not an easy matter at Olga Bay. The commandant mentioned Boussera, six miles below Lake Khinka, on the Sungachan, as the nearest convenient point on the Usuri. The journey hence takes 20 days. The Gilbert river affords 70 versts (46 miles) of water communication in canoes, but horseback is considered preferable.

Our country walk along the so-called military road, pleasant enough in July or August, must be a veritable "slough of despond" for the involuntary traveller after the spring-thaws of March and April. The road is certainly cleared of trees, and has a certain direction and breadth assigned it by our friend the topographical engineer; but Nature alone attends to the contingencies of repair. What her laws forbid her to do in road-repairs at spring time, her bounty makes up for in advanced summer. The fields here are one blooming surface of wild flowers of many varieties and hue. The air is laden with the perfumes of the wild clematis and wild rose. Though the eye be gladdened by the most brilliant colouring, still the general aspect of Olga Bay is, even at this, its most favourable season, saddening. Denied its military, and only hopeful of its commercial character, we are forced to accord it the condition or status given by a Frenchman to his own commercial settlement under military supervision, Saigon, as a port "waiting for de commerce."

XII.—*On a Communication between India and China by the Line of the Burhampooter and Yang-tsze.* By General Sir Arthur Cotton, R.E.

Read, June 24, 1867.

The subject of a communication between our provinces in Burmah and the south-western part of China, which has been talked of for many years, has lately again been the subject of correspondence between the India Office and the Government

of India, which correspondence has now been printed for the House of Commons. From this it appears that though there seems to be no intention of carrying out the design, and it is strongly objected to by some of the writers of these papers, yet orders have been issued to examine the line of country in Lower Burmah or Pegu and as far as our own north-west frontier in the direction of the Chinese province of Yunan, but not in the part of Burmah proper which lies between these.

It seems very strange that such a question as an internal communication between India and China, if it were raised at all, should be treated by all the writers in such a partial and imperfect way. This scheme has originated from persons connected with one particular province of India, and, as might consequently be supposed, it is treated by them entirely as a local question.

To the Rangoon merchant, of course, it was simply the question of how he could increase the trade of that port by making it the outlet of the trade of south-west China; and even to the local official it was necessarily also a question of increasing the prosperity of that province. But, when the question came before the Government of India, surely it should have been treated in a very different way. The real questions were, first, What is the importance of connecting India with China by a direct internal communication? and secondly, What would be the best line for such a communication with reference to the whole of India and the Imperial interests generally?

In the printed papers there is little attempt, in any of them, to examine either of these fundamental points; yet, till they are examined, all such partial discussion is only waste of time, and might lead to immense waste of money. Some years ago, when this matter was before under discussion, I wrote a short memorandum on the subject, and took the liberty of forwarding it to the Secretary of State, who transmitted it to Calcutta; but no reply was sent to me. There was, I believe, some little discussion on the point I had suggested, but, as usual, nothing was *done*.

The first question which I have raised—viz., What is the importance of a direct inland communication between India and China?—seems to require very little consideration to satisfy us that it is certainly a matter the results of which would be great, far beyond all calculation. The throwing open of all India to all China, the access of a country containing 200 millions to the produce of a country occupied by 400 millions, and the opposite, (to say nothing of Central Asia), would be of its kind a work of such magnitude as that nothing approaching to it has ever yet been seen in the world; and the export of a large portion of the

produce of Western China for Europe through our own principal port of Calcutta is an imperial question of the very first importance.

And even as respects the trade between China and Russia, the distance from Nankin to St. Petersburg is 5000 miles, almost all land-carriage, while the distance from the Indus to the Caspian is 1200 miles; so that on the line of India there would be water-carriage between those two places, with the exception of at most 1500 miles, and perhaps much less.

But perhaps the great point of all in this question is, that by this means we should have independent access to that country by a line on which there could be no interference on the part of other European or of American nations, by which we are so continually hampered in our access by sea. In case of war, the difference between having to guard our trade to the coast of China and to Calcutta would be incalculable, and I suppose at such a time our whole trade with China would be carried on through Calcutta.

What the traffic would become if the vast system of water-communication in India could be connected by a sufficiently cheap carriage with that of China it is impossible to estimate; but it would certainly be far beyond anything that has yet been seen, and would provide for a capital that would accomplish anything on this short distance of 250 miles between the two rivers.

It seems to me that these few words are quite sufficient to satisfy us of the vast importance of such a work.

The next question surely is not, Can a railway be laid from Rangoon to Yunan? but What is the best line by which a communication can be established between the two countries? There are three conclusive objections to the connection with Rangoon:—1st. That to lead the traffic to an insignificant port like that, if it can be conducted to the great port of India and the seat of Government, is obviously out of the question. 2nd. It would not connect the great body of India with China, but only an insignificant province containing 2 millions of people. 3rd. It is 900 miles from Rangoon to the Yang-tsze, almost all of which would probably be land-carriage; and it is, of course, essential to reach water-carriage in China, by which all the great traffic of the country is carried on. Without this, only a trifling traffic with the thinly-populated province of Yunan can be carried on, for nothing of any consequence can bear 1000 miles of land-carriage.

The moment we ask the true question, What is the best line for internal communication between India and China? it is answered—that is, so far as what is desirable goes—and that is,

the line from the navigable part of the Burhampooter to that of the Yang-tsze, a distance of probably under 250 miles. Indeed, in one place, according to the maps, it is only 80 miles from the one to the other, at points to which it is highly probable that both rivers are navigable; but it seems to be ascertained that there is very high ground between these points.

The Burhampooter has been navigated to the great bend near Sudiyah, and the Yang-tsze to probably within 200 miles of the nearest point to that, or about 1500 miles from the sea. Surely, there cannot be the smallest question about this being the line, unless it should be found to be absolutely impracticable, of which there is not the smallest probability.

1st. It is the shortest line between the heart of China and that of India, and also of the port of Calcutta. 2nd. It is the shortest line between the two systems of water-transit. 3rd. It does not pass through the heart of Burmah, or any other great foreign state, but only through small dependent or independent states, through which the objections to transit would be far less.

I need not here enlarge much upon the absolute necessity of water-carriage in order to make accessible the produce of any large extent of country; not 1 per cent. of what would be conveyed by water can bear the cost of thousands of miles of land-carriage. When we come to more than 100 miles, railway and all other modes of land-carriage entirely fail. They were lately carrying cotton from the north-west to Calcutta at 19*l.* a ton, and from thence to London, fifteen times as far, for 3*l.* Even valuable articles like cotton, worth 100*l.* a ton, cannot bear such a charge permanently. What becomes of the great mass of produce, worth from 5*l.* to 20*l.* a ton? They are either carried by water or not at all.

In France they are now revising the whole system of water-transit, improving and completing it throughout the whole length and breadth of the country; because they find they cannot compete with other countries while they are even partially dependent upon land-carriage.

The same in the United States. A report by a Commissioner has lately been laid before the Government on this subject, showing the absolute necessity of the most extensive improvements of their already magnificent water-communications. He says, "*To do away with the enormous cost of all rail transportation* across the continent, it is proposed to make a communication of navigable water from the Ohio River," &c. &c. And some of the projects now under consideration are, to improve the whole line of the Mississippi from the highest point practicable to the sea; to make a ship-canal from the Lakes to the

Mississippi; another ship-canal round the Falls of Niagara; to enlarge again the Erie Canal from the Lakes to New York, upon which they have only just expended several millions in enlarging it, &c. &c.

All this is going on in these countries in the face of the most complete system of double railways, showing that after many years' trial, they have been proved totally to fail to carry the great traffic of the country at practicable rates.

So it is in England even, short as the distances are here. The great traffic of the country is still carried by water, by the coast, rivers and canals, utterly imperfect as the internal water-communications are, not even fitted for steam power. Several of these miserably imperfect rivers and canals carry more than a million tons a year, with double railways running by the side of them; animal or human power on water completely beating steam power on land, after spending 30,000*l.* or 40,000*l.* a mile on the railway, while 4000*l.* or 5000*l.* only has been spent on the navigation line.

Nothing therefore can be more certain than that the one point of paramount importance in this case is to find the shortest practicable line of land carriage; and it is most remarkable that this line is the very one that meets the other requirements, if it is at all practicable. On the one side we have water-transit from Kurrachee, 3000 miles, to Sudiya, with only one interval of 150 miles between the Sutlej and the Jumna, of the easiest possible country, for which a canal has already been planned and estimated, and which would cost, perhaps, 300,000*l.*; and on the other several thousand miles of river and canal connected, of which one continuous line by the Yang-tsze, 1700 miles, the Grand Canal 100 miles, and probably 1800 miles of the Yellow River, is in all 3600 miles. So that this one line of 7000 miles, from Kurrachee into the heart of Chinese Tartary, is only broken by two intervals, one of which we know can be overcome at a cost quite trifling. There is, indeed, little hope of water-transit being established on the other interval of 200 or 250 miles, from what we know of the country; and this is undoubtedly a very great pity. But even a land carriage which would connect such vast extents of water-line, and such enormous populations, must be of incalculable value, and will certainly justify ultimately any possible expenditure.

The question then remains, What do we know of this tract of country?

On the Indian side we have the published sheet of the Indian Atlas, No. 138, compiled from the investigations of the officers of Government sent to explore it during the first Burmese war, as far as the Irrawady, with their reports, and also the reports

of Burmese merchants, who now trade between the two rivers, the Irrawady and Burhampooter. The former proceeded by water to 96° 30′, within 250 miles of the Yang-tsze, as it is laid down in the maps, and thence by land to the Irrawady; but on the line they passed over they crossed very high land. Their expedition terminated at the Irrawady, just 100 miles from the Yang-tsze.

The Burmese merchants are reported to travel by a road south of their line, and to state that there is no serious obstruction of any kind as far as the Irrawady, but what height they pass over I have not heard. Between the Irrawady and Yang-tsze I have no information, excepting what the published maps give, which appear to be all copied from the Jesuits' map of China.

Whether the latitudes and longitudes are there correctly given I have no information, and I think no European has visited that tract in modern times. The gentlemen who navigated the Yang-tsze proceeded to within about 200 miles of the nearest point of that river to the Irrawady, and they ascertained that it was navigable beyond that.

According to the maps the line from the Irrawady to the Yang-tsze is across the lay of the country, and the Yang-tsze and Mekom are represented as divided by mountains; but whether this is correct, or whether there are any steppes or passes through those mountains does not appear. In the course of my engineering experience so many supposed insuperable obstacles have vanished as soon as they were looked into, that I am always reminded not to be deterred by one till I have ascertained that it really exists.

Thus we are not certain that portions of this line may not be practicable for water-ways, nor what the precise distance really is. The first thing to be done, therefore, is to examine this line of country. It would be advisable to do it from both sides; on the Indian side following the route of the Burmese merchants to the Irrawady, and so on to the eastward; and on the China side steaming up the Yang-tsze as high as practicable, and then proceeding by land to the westward.

The late navigators of the Yang-tsze saw some of the chiefs of the tribes inhabiting the intermediate country (the Miaoutrees, as the Chinese call them), and found them extremely friendly, and willing to be visited. They are quite of a distinct race from the Chinese, and probably are of the same as the Kurms, north of Burmah. They seem to be a very fine race, in a state very similar to that of the Highlanders of Scotland 200 or 300 years ago. Proceeding thus from both sides it is probable that it would not take long to examine the 100 or 150 miles between the Irrawady and Yang-tsze.

It is more than probable that men might be found among the missionaries in Upper Assam and in Burmah who are already so well acquainted with those races that they would understand perfectly how to deal with them, and who would gladly undertake the duty of exploring the line. They might also know so much of the languages spoken as would facilitate the communication with them. A Livingstone might be found among them who could make his way to the moon, if only it were filled with uncivilized people.

Part of the line would, I believe, pass within the frontier of the petty states dependent upon Burmah, and part through similar states altogether independent.

If a small fast steamer, of the smallest draught, were sent up the Yang-tsze, it would be an easy matter to go to the highest point navigable, especially as there are coal-mines now worked on the very banks of the river, so that a steamer might proceed without any delay. If a small steamer like those sent out to the Godavery, drawing only 1 foot, and capable of working at 10 or 12 miles an hour, were used, it would be a very speedy voyage to the great bend of that river.

It might also greatly assist the expedition if a similar steamer were sent up the Irrawady. This river is represented in the maps as passing within 100 miles of the Yang-tsze; and it is not at all likely that it should not be navigable for very shallow steamers in June, when the snow is melting. On May 24th the expedition found the Irrawady in 27½° North latitude "fordable," so that it must have been navigable thereabouts in that month; for the ford would of course be chosen where the river was shallowest, and "fordable" would hardly mean less than 2 or 3 feet of water there. So also a vessel might be sent up the Mekom or Cambojee, one of the affluents of which is represented as flowing from a large lake 40 miles long, and within 20 miles of the Yang-tsze.

It is thus evident that upon examination the actual distance in which land-carriage may be found unavoidable may be very small. And it is almost certain that the distances between points to which small steamers may be run when the snow is melting are very short indeed; viz., from the Burhampooter to the Irrawady 100 miles, thence to the Saluen 50, thence to the Mekom 25, and thence to the Yang-tsze 25; so that land parties supported by steamers would have very little difficulty excepting such as might arise from the inhabitants; and we have every reason to believe they would be friendly if the expeditions were under the charge of missionaries who were accustomed to those races, and would know how to deal with them. Two or three small steamers, just large enough to carry exploring parties,

would not cost more than 2000*l.*, and this would probably be the cheapest way of conducting the expedition, as well as the safest.*

With respect to the mode of opening the communication, the main points to be kept in view seem to be—

1st. To open the line, in however rough a way at first, as speedily as possible.

2nd. To do it in an inexpensive way at first, connecting the line and perfecting the communication by degrees.

3rd. To have as little work on the spot as possible.

4th. To establish ports at different points, in which suitable persons might reside, to communicate with the different native authorities, &c.

5th. To establish light steamers on the different rivers, to carry materials, stores, provisions, &c., while the line is being established.

The great point seems to be to carry on the work so as to be as little dependent as possible on local labour. For this purpose there seems nothing like a very narrow-guage railway, such as is in operation in the vale of Festiniog in Wales, which is only 2 or 3 feet guage, and yet it is even worked with locomotives. Such a railway could be laid with extremely little labour on the spot, and could be finished in a very short time if the materials could be conveyed by water to three or four points on the line. It would of course be laid with very sharp slopes and curves in the first instance if necessary.

There would be many advantages in proceeding in this way, especially as so little expense would be incurred in preparing the ground, that the line might be altered at any time, as the country was more fully explored, without any great loss; the time required would be greatly reduced, &c.

The total first cost of such a line would be very moderate. If timber could be obtained on the spot, or conveyed by water from the banks of the different rivers, continuous sleepers, with square iron trams of only 1½-foot gauge on the same timbers, might be laid down in the first instance, to be worked by horses or bullocks walking by the side of the rails. A perfectly effective railway, of only 2-feet gauge, was laid at the Godavery works for the carriage of stone, which cost 200*l.* or 300*l.* a mile; and this would be of great use to initiate such a line of road while more complete works were in hand, so that by the time

* I cannot find any information respecting this line. Capt. Sprye and others have furnished information respecting a mere junction line from Rangoon to Yunan, but the line I speak of, from the great bend of the Yang-tsze, in lat. 26° and long. 100°, in the direction of Sudiya on the Burhampooter, as far as the Irrawady, seems to be totally unknown.

the latter were ready for the traffic, the traffic, having been in the mean time diverted into this line, would be ready for the railway.

Of course it would be of the greatest importance to make water-communication as far as the line could possibly admit of it.

I should add that a new importance is given to this line of communication at this time by the tea speculations in Upper Assam. It seems to be fully ascertained that that province is of extraordinary fertility, and that nothing is wanted but labour to make it one of the finest fields for the employment of British capital and energy that could be found. If only access could be given to it from China direct, there can hardly be a doubt that any amount of labour could be obtained.

XIII.—*Notes of a Journey in the North-West Neighbourhood of Pekin.* By Jones Lamprey, Esq., M.B., 67th Regt., F.R.G.S.

Read, June 24, 1867.

It was not till the autumn of the year after the signing of the Treaty of Peace in 1860, that the northern provinces of China were fairly opened to the excursion-loving Englishman. This delay was a wise and necessary precaution under the peculiar circumstances of our being so recently at war with the people, and our military occupation of an important city inhabited by a race who are characterised by self-conceit and a feeling of superiority over all foreigners. It was well, before going among such a people for the first time, that they should have some report of us, and that they should know that we were not the untamable savages we were hitherto supposed to be.

During our occupation of Tien-tsin, it was interesting to observe the change that took place in the dispositions of the inhabitants towards us, and how completely mistrust gave place to confidence. After a few months' residence among them, they soon saw that though conquered they were not oppressed, and that, though there was a force of about three thousand foreign soldiers quartered among them, they were amenable to law and order, and that justice, administered in matters in which they were parties, was as fair to them as to ourselves; they were paid well for anything we purchased from them or when they worked for us; we relieved their destitute poor, and established a hospital for their sick; all which circumstances being noticed by a peculiarly observant people, did not fail to spread our reputation throughout the northern provinces and secure that

respect and civility which the excursionists met with wherever they travelled.

The restrictions to travelling were removed gradually. At first a party consisting of two or three were allowed permission to visit Pekin for a few days, where they were sure of enjoying the hospitality of the Embassy. On their return others obtained the same privilege. Subsequently these visits were extended to the Great Wall. One party, more venturesome, made the attempt to explore further inland, and succeeded in seeing much of novel interest, without meeting any unpleasant adventure; and, by the spring of the year 1862, the excursions were extended into Manchuria, Mongolia, Shansi, and Shantung, so that by this time the northern provinces have been pretty freely traversed.

Of the different routes taken at first it is difficult to say which was the most interesting. One led to Moukden, the ancient capital of the Manchus. Another to Jehol, a royal residence made famous by Lord McCartney's expedition. Another to the humble but hospitable tents of the Mongolians and their flocks. Another through the bold and picturesque mountain passes of Shansi, while the level plain of Pechele was not without its interest, though no doubt Shantung possessed the most interesting of all objects—the tomb of Confucius and the family residence of his living descendants. Thus the traveller, who has already exhausted the west of Asia, can now turn to the further east, where he will find a most interesting and in some respects a comparatively unexplored country.

The facilities for travelling in the north of China are abundant; the country is everywhere traversed by tolerable roads; there are excellent Tartar ponies with the best of reputations for strength and endurance; also the ordinary country mule-carts, and innumerable inns, though there is occasionally no small discomfort to be encountered in being at times obliged to rely on the food of the people dressed after their own fashion, and the inferiority of inns sometimes met with in remote places.

To enjoy an excursion into the interior to the best advantage much depends on the season of the year. In the autumn the weather is sufficiently cool to make travelling pleasant, till towards the middle of the month of November, when a sudden fall of temperature to freezing point makes the nights sufficiently cold and disagreeable. Still excursions have been made in mid-winter with a temperature not far from zero, and occasionally many degrees below it, but it requires the hardening of a previous winter to make an excursion at this particular season either safe or agreeable. By far the pleasantest time is the spring, in the months of March, April, May, and a portion of

June, when the landscape puts on a most refreshing green appearance, and the innumerable flowering plants and trees of the country deck themselves with their gayest blossoms and verdure.

The appearance of a party starting on one of these excursions was somewhat picturesque; the country carts, mule drivers, and Chinese servants, gave it a peculiar character, while the costume of the Europeans, though much modified by furs, &c., was sufficiently national to excite the amusement of the people wherever they were met with. Hats were, of course, completely discarded, and gave place to fur caps or wide-awakes wrapped in pugrees; the cloth coats with their numerous pockets, the peculiar cut of the nether garments, and the high leather boots with spurs, were enough to distract the equanimity of any Chinese mind, and would doubtless in many instances equally astonish friends at home.

The cart is the ordinary mode of conveyance, and in the north of China it is stoutly built, has two wheels, and though not made with springs is tolerably free from jolting, owing to the softness of the roads and the easy pace at which it travels, generally at the rate of about twenty miles a day; it is covered in with cloth stretched over a wooden frame-work made large enough to accommodate one person comfortably with his bed and baggage. Although built after a common pattern, those belonging to the wealthy are fitted up with no ordinary care and neatness; they are yoked to a mule, with untanned leather harness, consisting of a bridle and long driving-reins, a collar to which the traces are attached, a straddle and bands to support the cart; altogether much resembling our own method. A second mule is frequently attached with traces connected with the axletree, and kept from tangling by being passed through iron loops fastened on the free ends of the shaft. The driver shows excellent skill in handling his wayward and often stubborn animals with reins and long-handled whip; sits on the shaft near the body of the cart shouting out repeatedly "Ghee! ghee!" or "Who! who!" just as an English ploughman would occasionally converse with his team. However rude they may appear in our eyes, these carts are undoubtedly the prototypes of our cabs and hansoms, and were long used in China before they were thought of in Europe. In Pekin these carts are to be seen standing in rows in the streets, waiting for casual hire just as our cabs do in London.

Having hired one of these carts, and packed it with what was thought to be necessary for the road, and taken the precaution to send it on the evening previous, under the charge of a Chinese servant, so as to get clear of the town, I mounted

my horse, a Persian Arab, which had recently been a troop-horse in one of the Indian cavalry regiments that had been employed in the late campaign, and started at an early hour the following morning, 23rd of October, 1861, in company with a guide who rode a Tartar pony. Proceeding through a long line of suburb, crowded at that early hour with people carrying their garden produce to market, we at length emerged into the open country, about two miles distant from the city gate. Leaving the Pekin road on the right hand, and following the southern bank of the upper western river, or Shang Shiho, for about three miles, we reached the ferry-boat station, where we had no difficulty in passing ourselves and horses across. This river, were it not for its rapid course, flowing eastward, should be, more properly speaking, called a canal, owing to its narrowness and the artificial embankment apparent in many places. It formed one of the important tributaries of the Peiho, which it enters close to Tien-tsin, and judging by the numerous long, narrow boats which were being tracked up it, in a manner similar to what one sees on the rivers of Bengal, it must support a very considerable amount of traffic.

Our course lay to the westward, over a flat, uninteresting country, having the same monotonous aspect and cultivated much in the same manner as seen in the vicinity of Tien-tsin. On all sides were fields of millet-stubble, or winter-wheat, beautifully planted in drills, now two or three inches above ground, and occasionally fields of cotton-plant. There was a considerable amount of recently-ploughed land; and now and again villages, surrounded with a few willow-trees, were visible in the distance. At length we reached a village larger than usual, called Wang-shing-To, and stopped at an inn to refresh ourselves and horses. This inn was a poor affair, compared with others subsequently met with. In outward appearance it differed little from the wretched shops in the street, except that it had a temporary verandah, constructed of wattles and mats, before the door. On entering the inn, I found a strong odour of oil frizzling in stewpans, into which the cooks were dropping morsels of pork or mutton; other men were busy chopping up vegetables, or kneading dough, or baking cakes in ovens. In short, this was the kitchen of the establishment, through which it was necessary to pass before entering the proper *salle à manger*. This consisted of a long, low room, lighted at one side by papered windows; several small square tables were arranged at each side, and separated from each other by rickety forms, which were mostly occupied by countrymen apparently of the same class as the mule-driver and servant, judging by their outward appearance. They were all busy with their

morning meal, poking the morsels with the chopsticks out of the bowls held in the left hand. The chopped meat, vegetables, rice, soup, &c., were all served up in small bowls, each combination having a well-known name. The farthest end of the room was provided with a kang, or raised platform, constructed apparently of solid masonry, but having in the body of it a flue, leading in a tortuous manner from a fireplace constructed outside the room, so that when the kang becomes heated it affords a comfortable sleeping-place during the coldest weather. This also constitutes the bedroom of the establishment. These kangs are in universal use throughout the north of China. We saw them in the Summer Palace, and in every house we occupied during the expedition in the north of China; even the beggars' hovels are provided with them. The kang in this inn was occupied by a party of men, who were engaged drinking tea and smoking pipes; others were fast asleep and stretched out at full length on it.

So soon as the servants and horses had finished their meals we moved on our journey, still to the westward. The road led through a more wooded country; the trees were chiefly willow, of a good old age. The country people gave very little heed as I passed by, being all much engaged in threshing out the millet-corn, or carting home from the fields the millet-stalk, &c. The castor-oil plant appeared to be cultivated to some extent. Still the country continued flat; farther on, however, at a distance of about 25 miles from Tien-tsin, the country became slightly undulatory, and at length our road passed on to an embankment which one would suppose was originally constructed for a railroad. Further on, this embankment had more the appearance of being at one time a sea-cliff, or deep river-bank, having on the southern aspect a declivity of about 50 feet; while on the northern side a small bund separated the summit from the country which was on a level with it. On leaving the road, and turning to the north to see more of the upper plateau, I found, at the distance of about a mile, the dry bed of a river, which, I found, was the Hoen-ho, the water of which had been turned into the Shang-shi-ho by means of a dam built across it some distance up its course. During the melting of the snow and ice in the hills where it takes its rise, the water overflows the dam, and boats from the Peiho are able to sail up it for a short time. There were a few boats observed on its banks, but they had all the appearance of being ferry-boats. This river rises in the Shi-shan, and enters the Peiho near Tien-tsin. On looking over the lower plateau, I noticed several smaller bunds extending some little distance from the embankment, and fancied they had been constructed for the purpose of reclaiming

land or preserving it from an overflow during periods of floods. The aspect of the lower plateau had much the appearance of being a dry bed of a great river several miles in width: the country for that distance to the southward appeared to be arid sand, with insular patches of cultivation and willow plantations. This character was preserved for some miles along the course of the embankment. Could this be one of the original channels of the Yellow River, which tradition and the topographical histories of the Chinese say once flowed, and now is known to flow, into the Gulf of Pechili?

On my return to Tien-tsin the road led more along the course of this embankment, which I found gradually lessened in height till it approached within a few miles of Tien-tsin, where it sloped off to the level of the surrounding country. There was one part of its course I observed to have been recently constructed: it was in a part where the Hoen-ho approached close to it, and burst a way through to the country on the south and did much damage. There was no doubt that it was artificial, but in other places I could get no information from the country people further than "it was always there."

After the sun had set and it became dark, we descended to the lower plateau and entered a village, where we found an inn scarcely worthy of the name. The morning air of the following day felt very chilly, and a dense fog obscured the landscape. Our road led through extensive plantations of dwarf willow, cultivated for making the baskets which are in such general use all through the northern provinces. As the day advanced, the sun shone out through the morning mist, and, after a pleasant ride over undulating ground, through willow-plantations and orchards, we arrived at a village where the guide said he had some relations. I was glad of the opportunity of seeing the interior economy of the houses belonging to his class of the people, and readily consented to stay at the house where he proposed to stop at, intending to move on the following day. The village consisted of about twenty houses, mud-built and one-storied, some of which were tiled, others thatched with straw, and arranged in a straggling manner along the road and shaded mostly with willow-trees. On the opposite side of the road in front of the house where I stayed there was a large space, enclosed by a fence of millet-stalk, forming a farmyard, in which Indian corn, millet-stalk, cotton-stalk, bean and cessamum plants were stacked. In the centre of the yard a hard, even surface was prepared for threshing the different plants, which is done by different methods. For instance, the beans and cessamum plants are taken up in bundles in the hands and beaten against a standing framework; the Indian-

corn cobs, previously sun-dried on the roofs of the houses, &c., are struck by long sticks by men and women sitting round a heap of the cobs on the ground; the cotton has already been picked by the women and children while the plants were standing in the field; and the millet, whose cobs have been removed from the stalk in the field, is separated by means of a stone roller, not unlike a garden-roller, yoked to a mule or a donkey, and frequently passed over the cobs scattered in a wide circle on the ground. Millet is by far the most universally cultivated crop in the north of China, not only on account of the food it yields for man and cattle, but also from the variety of useful purposes to which every part of the plant is applied. To enumerate them all would be as endless as enumerating the purposes to which the cocoa-nut palm serves in tropical countries. The stalks vary from 6 to 8 feet in length, and are about an inch in diameter at the base, tapering to half the width at the top. The stem, although jointed, is not hollow as in other cereals, but filled with a light pith: hence they are sufficiently strong for fences, for thatching, and for forming, with a layer of mud, the side-walls of houses for the poor. When split and made flat they are woven into neat-looking mats, used in covering the kangs on which the people sleep. The millet-stubble, which remains after the stalks are cut, serves as a tolerable material for fuel. The large quantities of millet-stalk found in the villages of Petang and Taku afforded no small aid to the military operations of the English, in 1860, in constructing batteries, filling up ditches, and making roadways over swampy ground,—uses to which the Chinese never thought they would have been applied.

While staying at this house I had abundant opportunities of examining the farming implements commonly used throughout the north of China, and amongst them I was much struck with the seed-sowing machine in general use. It would be difficult to describe this apparatus without the aid of a model. Their plough is a very simple contrivance. The share resembles a shovel, with a mould-board on the upper surface to turn off the sod; both are made of cast iron, and very simply tied on the wooden frame of the plough. There is no coulter required, as the soil is so loose and friable that it would be unnecessary, and the farmer is satisfied with mere surface-ploughing. Sometimes one bullock is sufficient to draw the plough; sometimes a bullock and mule, or donkey or pony are yoked together. The field, when ploughed, is harrowed with a very simple harrow, consisting of a triangular frame of wood, having a number of sharp-pointed iron prongs, about 8 inches in length, projecting on the under side. This harrow is usually yoked to a bullock;

the driver, standing on the upper surface of the frame, gives it weight and makes it hold to the ground; it is drawn over the ploughed field until the clods are broken into a tolerably even surface, and all the roots of the previous crop have been removed. Another harrow is now applied: it is made of strong wattles plaited together; the driver stands on this while a bullock draws it over the field in all directions. These operations effectually pulverise and level the soil; but the Chinese farmer does not rest satisfied with this ploughing and harrowing for the cultivation of the future crop, whatever this may be. As soon as it makes its appearance above ground he commences working the soil about the growing crop with a hoe of a particular shape, and, as he knows that the produce of the crop will be equivalent to the amount of labour bestowed on this work, he is unceasingly employed at it. One great result of this careful tillage is the remarkable absence of anything like a weed in their fields.

In districts remote from large towns or villages the farmers are necessarily but badly supplied with materials for fertilising the land; they are consequently economical of it, and carefully collect it on every opportunity. In land set apart for winter-wheat small quantities of stable manure are harrowed into the soil in the first instance; and while the crop is growing men may be seen, with baskets suspended from their necks, walking up and down the fields scattering in a powdered substance, as if they were feeding some hungry poultry. This is the oilcake made from the Chinese bean (*Dolichos*), cotton-seed, or cessamum, in the process of pressing out the oil. The enormous production and consumption of these substances make them considerable articles of trade throughout China.

The rotation of crops is practised as far as possible, though for successive years millet will be planted in many extensive districts. The periodical floods which inundate the land, by depositing fresh alluvium, may in some measure account for this unusual fertility of the soil. The choice of crops rests with millet, Indian corn, sessamum, cotton, pulse (*Dolichos*), tobacco, wheat, barley, and sweet potatoes; and, with such a variety, it requires skill and local experience to determine which is the best for present cultivation.

Beyond the barn-yard, which contained several large ricks of straw and Indian corn-stalk, &c., I found a vegetable garden laid out in neat beds, and well-trimmed side-walks, and containing white cabbage, turnips of three sorts, brinjal (*Solanum melongena*), onions, eschalots, chillies, a few plants of tobacco, a plant or two of savine, cucumber, melon, tomatoes, a few plants of the sweet millet (*Sorgum sacharatum*), resembling the

common millet in every respect except that the stalks were taller and more slender, and the seed was of a white colour. A plant or two of Chinese pepper, a grape-vine, several peach-trees, a Chinese date-tree (*Rhamnus*), and some high-growing willows constituted the trees. A balsam or two, a few chrysanthemums in full bloom, a colossal sun-flower, and an uncommonly gorgeous cockscomb were the only approach to what we would call garden flowers.

On the march of the army on Pekin, in 1860, large deep pits were frequently met with in the middle of the fields. Some of them had such a formidable appearance, that it was supposed they were intended to entrap the army on their march; however, it was subsequently ascertained that these pits were intended for storing the sweet potatoes during the winter. White cabbage and other vegetables are preserved in a fresh state for four or five months of the winter, by burying them in similar pits; so that vegetables, with all the freshness of being recently taken from the garden, were procurable in the markets of Tien-tsin throughout the winter.

I had here the opportunity of learning something about the cultivation and preparation of cotton—one of the principal products of the province, if I may judge by the large area of ground I saw under its cultivation, and the large supplies of it for sale in the various fairs I passed through on my journey. The seed is sown in the second or third moon (May or June), the blossom appears in the sixth moon (August), and about the eighth moon (October) it is fit for gathering. I noticed that the plants were not over 22 inches high; they still showed a large number of pods ungathered, although the harvest was nearly finished. It appears that the low growth is owing to the practice of nipping off the tops of the plants, about the fourth or fifth moon; this has the effect of dwarfing them, and at the same time forces the blossoms. Whether the staple of the cotton is shortened by this process remains to be seen; with much care in the cultivation, a plant will produce from 60 to 80 blossoms and from 50 to 60 pods. I could hardly believe this information correct, but was assured that such was the case. The crop must be gathered in by the ninth moon, as frost destroys the cotton when in the pod.

I also learned that one mow, equal to the fifth part of an acre, yields about 100 katties* of cotton boles, or 35 katties of cleaned cotton; each mow of land costs about half a dollar a year, and each katty of clean cotton realises from 17 to 20 cents. The cotton-seed is useful for feeding cattle, and yields a valuable oil and cake, very much used as a manure. The value

* A Katty = 1⅓ lb. in weight.

of the seed is about 1½ cent. a katty, and taking into consideration that the stalks of the plant, after the crop of cotton has been gathered from it, serve as fuel, the cultivation of cotton is sufficiently remunerative to the farmer. Unfortunately the price of cotton in the north of China is too high to admit of its being exported under ordinary circumstances with profit. The shortness of the staple is objectionable to the cotton-spinner in England, whereas the length of the staple is a matter of indifference to the Chinese, who consume large quantities in padding their garments and manufacturing a narrow hand-spun cloth, of a coarse texture, but very durable; in short, the Chinese are the greatest cotton-consuming people in the world.

Hearing a musical sound resembling the tom-toming in India, in the next house, I inquired what it meant, and was told that cotton-cleaners were at work. On entering the house, which was readily allowed me to do, I found a man at work with a cotton-bow, similar to that used in India, only of larger and stouter dimensions, corresponding with the superior physique of the Chinaman. I also noticed another man working a cotton-gin, by which he was removing the seed from the cotton; the apparatus worked very rapidly and effectually, and was worked with hand and foot. The principle of its construction was simply a contrivance to press the cotton-seed out of the cotton-pods or boles, by passing them between two rotating closely-pressing horizontal cylinders or rollers; the seed unable to get between the rollers fell to the ground, while the cotton passed to the opposite side. There was a stout string of catgut tightly stretched along the further opening between the two cylinders where the cleaned cotton passed out; but what particular object was attained by this contrivance I could not make out.

It appears that cotton cleansing in the north of China is a separate branch of industry, and those who practise it go about from village to village, carrying their simple apparatus with them; they are generally in couples, one working at the gin, while the other works at the bow.

On making an excursion in the neighbourhood of this house, at the distance of a couple of miles, I came upon the high embankment before alluded to; it seemed to hold the same course to the north-west, and resembled the embankment of a railroad so closely, that it only required the sound of the whistle and the steam in the distance to make the picture less imaginary. Ascending the embankment, I found, not far off, the dry bed of the Hoen-ho, and wandered along its course for some distance in search of shallow pools, where, my guide informed me, wild-fowl were sometimes very abundant. I only succeeded in seeing their foot-prints in the soft mud.

On the plateau below the embankment I observed rather a comfortable-looking village, having a large temple-like building and some brick houses in good repair; my guide informed me that it was inhabited by Mahometans, who were the terror of the country all round, owing to their thievish propensities, especially cattle-lifting; and to secure themselves in some measure from theft, the neighbours subsidised a man of the village, who is usually successful in restoring a lost horse, donkey, or bullock, if the recompense is sufficiently liberal. It was also hinted that this man was in league with the rogues, who altogether wore a more prosperous appearance than what dishonesty usually confers on people in general. Their ostensible occupation consisted in the manufacture of an alkali of considerable mercantile importance. The soil in this particular spot, as in many other localities in the province, is so thoroughly impregnated with natron, that it may be collected to any extent without being exhausted. It appears in the form of a white incrustation on the surface of the ground, like hoar frost; this is swept off the surface of the ground day after day. These sweepings are placed in a large vat with water, and filtered off in the form of a highly-concentrated transparent liquid, which is evaporated by being boiled in large cast-iron caldrons, till it is in a fit state to crystallise; it is then poured into wooden boxes or moulds, about $2\frac{1}{2}$ feet long, by $1\frac{1}{2}$ foot wide, and 6 inches deep, so as to make a large block weighing about 1 cwt. It is largely used by the Chinese for cleansing purposes, and forms an item of considerable trade in all the towns of the north.

The presence of a foreigner in the village was soon reported through the neighbourhood, and on my return to my lodging many came to see the Maou-tse, as we are commonly designated in the north: this is rather a term of contempt, and implies that we are the same as those rude tribes bordering on China, who are characterised by wearing their hair long.

Amongst those who came to see me were some well-informed, well-to-do people, though most of them were of the common rustic class; the latter were well clad, and had all the appearance of a similar class of people in most civilised European countries. They were a healthy-looking robust people, and were very civil in their behaviour. Some of the more intelligent visitors asked me many questions, showing that they were an inquiring people, and would yet learn many things from us to their own future advantage. They evidently see a new era in their history dawning upon them, and expect many changes to take place. All expressed themselves favourably of the English merchants settling at Tien-tsin, and remarked that as it would not now be necessary for their own merchants to go

down to Shanghai to purchase merchandise, such things would be more abundant and cheaper than they were formerly.

Hearing that there was to be a fair this neighbourhood on the morrow, I was induced to delay my departure, particularly as it gave me an opportunity of seeing one of the institutions of the country, which had not been before noticed by travellers. This fair happened to be a Kan-shever-meaou, meaning a fair where, in addition to the sale and purchase of various commodities, bachelors go to look out for a wife. There are several such fairs held annually throughout this province, and I had subsequently the opportunity of visiting others during my journey.

27*th*.—The heavy rain prevented us starting in the morning. As it cleared up in the course of the day, though it still threatened to rain, I took my gun and dogs to see what shooting was to be had in the neighbourhood, and only succeeded in bagging a few quail and a large wild goose. I got a few shots at some very fine wild ducks, but they were too wary to let me get near enough. I met with the greatest civility from the country people, and had an opportunity of noticing the carts of the country. They were mostly drawn by oxen, and were strong and servicable, though the wheels were of very primitive form.

28*th*.—Started for the Shi Shan, or Western Mountains. The morning was very foggy, and we could scarcely see our way clearly over the road-tracks through the fields, there being no hedges or fences of any kind to define our route. Throughout the rural districts a small line of unploughed land, about a foot wide, serves as a boundary, so that the apparent absence of boundaries is a peculiar feature of the landscape of the level country. At length, about 10 o'clock A.M., the sun shone through the dense mist, and the day became bright and warm. Our road took a north-westerly direction, and was at times rather tortuous. After a slow ride through a country thickly covered with plantations of pear, apple, peach, poplar, and other large timber trees, some of which resembled beach, all planted in regular rows, the country passed over became more undulating, and now and again opened out into extensive plains, covered with millet-stubble or winter wheat. We passed by two or three large villages surrounded with a mud wall and double ditch, and at length reached Kuna Shan, a small walled town. The crenelated wall was beautifully perfect and new-looking. It was built after the same model as that of Tien-tsin. The gates also had much the same appearance, and were placed in the centre of each of the four walls, but the structures over the gates (guard-rooms) were in a wretched tumble-down con-

dition. I entered the western gate, and found no guard present, and the inner gate alone was capable of being shut. On passing into the city, instead of finding a large population and numerous houses and streets, as I expected, only a very small portion in the centre had houses built on it, the remainder was a waste, or covered to a great extent with water, on which flocks of wild duck were seen swimming about. Riding through the main street of the city, I stopped at what appeared to be an inn, seeing some carts and mules in the yard, and the usual sign of such establishments hung up outside. This sign consisted of a bundle of paper, the lower part of which was cut into thin ribbons, and intended to represent pie mien, a sort of macaroni, one of the chief ingredients of Chinamen's food; finding the place so wretched that it had not sufficient food for us, we went on to another inn in the southern suburb of the city, where we had breakfast and baited our animals. It may seem curious, but the best shops and hotels in China are generally found in the suburbs outside the cities.

This town had formerly a ditch round it, but it was filled up with soil, and hence the accumulation of large pools of water within the walls, so that the surface of the country must have undergone great alteration either through floods or dust-storms.

Having baited our animals, and refreshed ourselves with breakfast and some delicious soft pears purchased here, the only ones that at all resembled the European fruit, we met with in the country, we started off in a north-western direction, leaving the western gate of the city on our right hand. Shortly after leaving this city, we got sight of the mountains in the west, which was gratifying after so long gazing on the level plains around Tien-tsin. Still the surrounding country had much the same appearance. Towards sunset we arrived at a river flowing from the north, called the Lu Leeho, and had much difficulty in crossing it, owing to the strong current flowing at the time; however, nothing appears impossible to the Chinese to accomplish when they once set their mind to it. After no little manœuvring with ropes, we got the mule-cart down a very steep bank on to a ferry-boat, and with much trouble got our mules and horses on board, and so were ferried over.

I noticed several men and boys carrying coal to the river-bank in baskets; they brought it from the coal-mines not many miles distant, from a place called Chu Jola. They carried it to villagers on this side of the river. It was dark when the cart and horses got once more on *terra firma*, and we had to continue our journey for three or four miles before coming to an inn. Our journey amounted to nearly thirty-one miles a

day, and our position, according to Chinese statement, is as follows:—

Pekin, 100 lee N.E.
Pow-ting-foo, 200 lee S.W.
Tien-tsin, 202 lee S.E.

By ascertaining the relative position of a place to two or three other known localities, it was not a very difficult matter to mark the place on a map; from these data I constructed one on my return, and found it very little out when compared with the Jesuit chart of the province. The mule-cart drivers know the distances of places to a mile, and they have a very correct notion of the compass-bearing also, as if they had been accustomed to its use.

It was long dark before we arrived at our inn. The town or village was called Teow-oiea. The western hills were distant thirty miles.

29*th*.—Started at an early hour, enveloped in dense fog. As the day advanced this fog cleared off, and the mountains did not appear to be very far distant. After a ride of about six miles I reached a walled city, called Chu-Jola, with triple sets of outer doors to each gate. The south wall of the city is only about a quarter of a mile in length. The east and west walls are about a mile long. There are two beautiful Tsais in it; they are close together, near some temple buildings; there are no balconies about them, as in many others.

While passing through the streets of the city I noticed a number of black, sweep-like fellows leading mules or donkeys laden with coal from the coal-mines, about 5 or 6 miles distant. There were also a number of mules laden with baskets, or open sacks of cotton. The beautiful snow-white cotton and the black coal being brought in close contact made a strange contrast.

Passing out of the northern suburb, I found myself entering on a beautiful causeway, a third of a mile in length, having ten arches, and built of very large blocks of marble and granite. It was 40 feet in width, and protected at the sides by a high parapet, ornamented with entablatures, on one side of which I noticed the figure of a lion, remarkably well executed in bas-relief, evidently copied from nature. On another entablature I noticed the figure of the Asiatic elephant, holding a pine-apple in his trunk. This figure was also the work of a good artist, and was apparently a close copy from nature. A large tablet on the side of the bridge stated that it was built in the Tong dynasty, 7th century, one of the most remarkable dynasties of China, which at that period held sway as far as the Caspian in the north, and southwards over the present Indo-Chinese kingdoms. Thus the lion and the elephant may have

been intended as symbols of the extent of the kingdom. The further extremity of the causeway was terminated by a gate-like structure of curious design. Though formerly of use in spanning a wide river, it is no longer so, as a small stream alone remains. To the eastward there was an appearance of a wide lake having existed there at one time, but even this is at present under cultivation. Passing to the country beyond, I found the same cultivation of crops as in other localities, wheat, millet, Indian-corn, cotton, &c. The road led in a northern direction, so directly that I found we were passing the southernmost point of the range, leaving it on my left hand. I then took a course across country, and was fortunate in finding a road, which led to the hills in a circuitous manner. Passing through a village at the foot of the hills, I saw some fine slates, which were quarried in the neighbourhood. Entering a valley by a tolerably good road, I met some countrymen, and enquiring where the road led to, &c., we rather puzzled them to understand why we were there, or what we were doing; and on telling them we came to shoot pheasants in the hills, one of them wanted to know if I was engaged in that particular line of business, and if I was also buying pheasants; however, they kindly directed us on to a village, where we would find a temple in which we could get lodging accommodation for the night, now fast coming on.

Proceeding for about two miles by a narrow road, leading through a contracted valley, we arrived while it was quite dark at the temple called Poo-je-Tse. Our arrival being noised abroad, some of the villagers called to see the foreigners, and among them a very obliging fellow, who proposed to be my guide through the mountains in search of game, assuring me that he was a very good sportsman himself, and that there were deer, antelopes, bears, tigers, wolves, foxes, hares, pheasants, and partridges, so it was arranged that we should start at an early hour on the following morning in search of game.

30*th*.—Passed a tolerable night in the temple, and after breakfast found my sporting friend kept his word; he brought with him, as his fowling-piece, a common matchlock; and had a lighted joss-stick in his hand to light his match when required. We took the hills on the southern side of the valley, and soon saw that dogs were perfectly useless in the country, owing to the presence of a dwarf plant, of a species of *Rhamnus*, scarcely higher than the grass, having very sharp strong spines, which disabled the dogs in a very short time, and had on one occasion caught the ear of one of my dogs, and held so fast that, had I not seen the poor beast, she might have been lost. My sportsman shortly pointed out

the spoor of a fox, and, on going up to the top of the steep hill, I saw him. He was one of those large foxes with very long fur, so highly prized by Chinamen for winter clothing. I fired at him, but he was too far off; and shortly afterwards I found my sporting Chinese friend also fired at him as he ran past him, but only wounded him slightly; showing he had considerable expertness in using the clumsy matchlock. We discovered traces of his blood, which, with the help of the dogs, we followed for some time, till we found he had gone to earth. My dogs being completely exhausted I was obliged to return to the temple, and after refreshing myself with a cup of Chinese tea—here drunk without milk or sugar—I ordered my horse and rode up the valley for about four miles. The scenery in front and on both sides of the valley was beautiful in the extreme.

As many of the people of the hamlets along the course of the valley came out to see me, I noticed that goitre was very prevalent among them; some young women had it developed to a very large size. The common scarlet persimmon-tree was very abundant. There were extensive pear-orchards in various places throughout the valley. The pears had been already collected and stored in peculiar hive-like structures, placed near their houses or in the open fields, where they remain till disposed of to people who come from Pekin or other localities in the plains. I had an opportunity of seeing how these structures were made. There were first a row of trenches cut in the ground to a depth of about two feet, over these a layer of wattles were spread, then some millet-stalk; and resting on each of these drains was a large mat, united at both ends so as to form a ring about five or six feet in diameter, and about four feet high. The pears were placed inside this, resting on the millet-stalk below, and above all another mat was placed, so as to form a conical-shaped roof. This kept off the sun and rain effectually. The drain underneath was necessary to admit of some ventilation through the mass of pears above, and to allow the exudation of moisture from the surface of the fruit to pass through. The pears were fully ripe, of a yellow colour on the surface; very good to eat, and, though rather hard, were very juicy. They are very much sought after by the Chinese, especially when sick.

The hills on each side of this valley appeared very abrupt on their southern aspect, while they were more sloping on the northern. The rock varied considerably. A gray, slaty, stratified rock prevailed to a considerable extent; and at the further end of the valley enormous slabs of fine slate, capable of being turned to account, appeared in the river-bed, and projected from the sides of the hill. On entering the valley, quartz rock, and in parts a freestone grit cropped up; but there was no other

appearance of granitic formation; at the further end of the valley a black basaltic rock rose perpendicularly to a height of two or three hundred feet. At the base of one of the hills on the northern side of the valley I found some nodules resembling kunker. The general appearance of this valley gave me the idea that it had been a creek, at the time that water occupied the level plain to the eastward, and when the western hills formed the western boundary of the Gulf of Pechili.

31*st.*—Intended visiting the famous Temple of Shan-fong-shan, situated high up in one of the mountain gorges, within a short distance of us, but was induced to deviate from the road up a valley, where I was assured there were pheasants to be shot. Taking the sportsman and a coolie with me, and having sent on my servant with my bed further up the valley and close to the precipitous bluff, to a temple called Swang-ching-meau, we made a circuit round the hills by a very picturesque valley, in which there were a few patches of cultivated land, fenced in by stones and the usual pear-tree orchards.

Late in the evening we reached the temple, as appointed in the morning, and found my servant and bed already there.

November 1*st.*—Left the temple shortly after the appearance of daylight, and taking my gun and dogs beat a very likely cover not far off. The trees were walnut with an undergrowth of scrubby oak, having beautifully tinted leaves, now commencing to fall. The morning was remarkably fine and the air bracing, numerous birds flitted about the trees, and the song of the mountain-thrush resounded on all sides, besides linnets, finches, and many others, whose notes and calls I could not make out. Finding no game, I returned to breakfast at the temple where I passed the night. And just as I arrived I saw a large flock of a curious-looking goat being led out to pasture. The old ones had very long hair of a dark-grey colour touching the ground, and the kids had a short, curly, jet-black coat, resembling Astrakan lamb-skin. I have since seen some very fine skins of the kid of this species of goat from Shansi which could not be distinguished from Astrakan lamb-skin.

I learned that the name of the mountain over the temple is Wai-sa-poo-shan; its summit is extremely serrated and its face all but perpendicular. There is a similar range to the north, and the temple is at the angle where the two ranges join each other.

After breakfast we started for Shan-fong-shan, having thanked the priest for his hospitality and presented him with a dollar, which he received with much assumed unwillingness, being, as it were, against his conscience to accept any gratuity.

After a tedious and difficult ascent of what appeared to be

about three miles up a narrow gorge in the northern hills bounding the valley, I reached the famous Budhist monastery of Shan-fong-shan. Parts of this gorge were extremely magnificent in their bold scenery. On each side were precipitous rocks, with overhanging pine or other trees rising out of the clefts or wherever a little soil was collected. On reaching a precipitous part about the middle of the journey the pathway led up a very steep flight of steps cut out of the rock; on each side there was an iron chain fastened, by which it was necessary to hold while ascending or descending. On the top of these steps we passed through a doorway and entered a kind of temple-looking building, where it was customary to rest and recover from the fatigues of the ascent. A few priests lived in these buildings, and no doubt formed a sort of guard to protect the approach to the monastery. They were very civil to me, offering me tea to drink and pipes to smoke. They also offered delicious cool water, which was still more agreeable. Continuing our journey over less difficult ground and through beautiful scenery, in which I noticed a small cascade overflowing the rocks in a very precipitous place. I was told that in winter this formed a very fine cone of ice, which daily grew higher and higher, as the water did not cease flowing. Occasionally a flight of jays (*Urocissa*) would be disturbed and fly over our heads from one side to the other or up the valley, their long tails and blue plumage making them very pretty objects in the scenery. At length we reached the largest of a number of temple-buildings, called Ho Soi Tse, and were ushered into the reception-room, where the head of the monastery welcomed me in a very civil manner.

After resting a little while, I expressed a wish to go further up the hill, and taking my gun with me and one of the priests for guide, he led me in a north-easterly direction up a narrow footpath, in parts very dangerous, and the grass being dried up my leather-soled shoes could take no hold on it, so that I felt as if I was walking on ice, which was anything but comfortable as the way led along the margins of deep precipices quite sufficient to make one's head feel dizzy; on getting to the summit I was well repaid by the magnificent view before me, and sat down for some time to enjoy it. I found the hills on the other side cut up by deep perpendicular precipices, some of which appeared to be of great depth. The country beyond in the direction of Pekin (eastward) appeared like a vast, level, sea-like plain, of a scorched yellow colour, with occasional insular patches of houses and trees and the courses of dried-up river-beds leading from the mountain-range to the eastward and southward. The horizon blended off into a dull impenetrable

mist. The pure air, the unusual stillness of the scene, and the bright sun, now beginning to set, made a vivid picture in the memory long to be remembered. On returning I made a long circuit round through the hills, and passed through much scrubby oak with a very large leaf. On nearing the monastery the bells began to toll from several detached buildings, some of which were high up on crags on the highest part of the hills around. The effect was very pleasing and solemn. As we approached nearer the chief temple building I noticed several detached buildings buried in the surrounding trees, some of which were very fine and old, and among them I saw one resembling the deodar of the Eastern Himalaya, its branches, having a great sweep, covered a large space of ground. On my return I found that a large, comfortable room, neatly furnished, was set apart for me.

2nd.—The tolling of the bells continued at intervals all night. At midnight I was woke up by the loud chanting of the service that was going on. Near the temple there is a cave with curious stalactites, and, from some legend connected with it in reference to a tiger, it receives its name of the Tiger Cave, and the temple is named from this cave, Ho-soi-Tsze, or Tiger Cave Temple; but, as I had seen enough of the place, I did not visit it. After breakfast I made preparation for a start.

While returning down the pass I saw several flights of the Chinese jay, or lan-tszor, which I have before mentioned. They appeared very beautiful in their native wilds as they flew from crag to crag. At the bottom of the pass I rested myself at another temple, the priest being very civil. I found this temple very clean and tidy, and a large collection of Chinese books in its library. After a short delay, I started off to the southward.

Finding the road to the southward was leading me back again in the direction of Chu-jo-la, and away from the mountains, and meeting with a cross-road, I determined on proceeding to the westward, much against the inclination of my guide, servant, and mule-driver, who, as it afterwards appeared, were advised by the priests of the monastery to avoid going westward and to go southward instead. Taking this westerly road, just as it was commencing to be dark, I could yet perceive the hills on my right hand had a most picturesque appearance, were very high, and rose abruptly from the plain; the summit was extremely serrated, not unlike the range observable at the end of the valley before alluded to: in some instances very high pinnacles were seen to project above the ordinary level, and in many parts they presented a strange overhanging appearance.

Some carts, heavily laden with bales of tobacco, passed us on

the road, and on inquiry from their owners I found the road led to She-Ling, one of the imperial burial-places. Darkness had now set in, and, as none of us knew the road, we were anxiously looking out for a house on the road-side in the hope of meeting with a place to rest for the night. At length we met with a very uninviting, solitary, road-side inn, and as we were told there was no better accommodation within eight miles of the place, we were obliged to stop at it.

In the mean time the landlord, who showed himself very civil by offering his pipe and entering into conversation, going through the customary formula of 'What is your honourable name?' 'age?' where I was from, and where I was going, and what business I was on? &c.; he then told me he had heard of my arrival at Shan-fong-shan, which he said was distant 40 lee, that is, about 13 miles; and from other places, as follows:—

She-Ling, 140 lee west.
Pow-ting-foo, 180 lee south-west.
Pekin, 140 lee north-east.
Chugola, 25 lee south-east.

After dinner was over I looked into the larger room, and found a number of men had lain down to sleep as best they could on the tables and kangs. I had my room all to myself, and passed a very good night. On the following morning I started off in search of some wild duck seen on a stream in front of the inn, and, returning unsuccessful, I proceeded on our journey westward; but after going a couple of miles further on, and learning that there was a comfortable inn at a place called Ta She Wo, and some small streams in the neighbourhood, where I observed some wild duck, I desired the cart and servants to stay there till my return to breakfast, while I took my gun and dogs, and went in search of some sport.

While eating my breakfast I was waited upon by a respectably-dressed Chinaman, who rode up to the inn on a very good pony, preceded by a servant, who was also mounted. He said he came to invite me to his house, as he heard that I was a wonderful sportsman, and that he would accompany me on a shooting excursion to the hills, as he was also very fond of sporting. Finding, on inquiry, that he was a respectable person, I was induced to accompany him to his house, situated a few miles off the main road towards the hills, on the borders of a small village. While on our way we passed several mules laden with coals coming from the hills, and on inquiry found that coal was procured in many places in the hills to the westward. I learned also that there were marble quarries in the neighbourhood, and soon came to one where a number of workmen were

busily employed. They were cutting out a large monolith. I found it measured 10 paces in length, and was about 3 feet in width and thickness. It appeared to be a fine clean block of white marble, though rather coarse in grain. It was intended for the construction of the late Emperor's tomb. A blacksmith was hard at work over his anvil sharpening the stone-cutters' instruments, which in size and shape resembled those used by our own workmen, but being made of iron and not steel, required more frequent sharpening at the forge. The quarry was almost in the surface, the rock being merely covered with a thin layer of red-ochery-looking earth, which appeared to be indicative of the presence of marble in several places.

I found my host a very civil Chinese gentleman. He said his age was sixty-five, and that he had been in the military service of his country in his younger years, and now retired on some property granted to him for his services. He was about 6 feet 2 inches in height, a well-made, straight-set, athletic-looking man. His house was not very elegant, on the contrary, it had rather a decayed, neglected appearance.

On sitting down my host offered me his pipe. He poured me out a cup of tea, and appeared much pleased at my presence in his house. He now appeared dressed in his common clothes, having taken off his visiting dress, and fastening round his waist a pouch, in which he carried his ammunition, consisting of iron shot, some leaden bullets, and coarse powder, and taking down from a shelf by the wall a rusty old matchlock, he brushed the dust off it, and cutting off a length of a rope like slow-match, he put it into his waist-belt pouch, and was now ready for the chase. Unfortunately, before leaving the house I gave him some of my powder, with which he loaded his matchlock, and had reason to repent doing so, as it will appear presently.

While I was at his house none of his family appeared in the reception-room except his son, a fine lad about sixteen years of age—it being the custom of the country for ladies to keep themselves aloof from visitors, unless of their own sex.

We visited several places where there were large marble quarries, and saw a great deal of well-cut stone lying about. My host informed me that formerly there was much work going on in those quarries, but that for some years back it had ceased, owing to the badness of the times. Pekin drew most of its building stone from these quarries, which also supplied most of the stone forming the bridge at Chu-jo-la. The blocks had lost their white marble-like colour, and became dark grey from exposure.

In our excursion we passed near several young plantations of that peculiar pine whose bark strips from the stem in oval

scales, leaving the under surface white, and so causes the stem to present a curious mottled appearance. These trees are very much sought after by the Pekingese for planting around their family burial-places.

We crossed several streams of bright, clear, running water, flowing from the hills, and at times passed through places which reminded me of home scenes. On one occasion I was astonished at seeing a regular mill-race, and following it down its course came upon a water-mill of curious primitive construction, showing a low order of mechanical skill. The water-wheel being made to rotate in a horizontal position, one shaft only was required to make the mill-stones revolve. In this mill the corn was simply ground, the Chinese mechanical ingenuity having failed, as it were, to adapt the same water-power to a contrivance for separating the flour from the bran.

Wherever the ground was sufficiently level there farming operations were carried on. The land was being ploughed, or winter wheat had already been planted, and was now growing, and fields of cotton-stubble showed that cotton was produced here also. It was also observed that tobacco was cultivated more generally.

I noticed several country carts laden with blocks of hewn marble on their journey to Pekin; and as each cart showed a small yellow flag, it was at once seen that they were employed in the imperial service, and were conveying the stone to construct a costly tomb for the late Emperor.

Late in the afternoon, as sunset approached, we sat down on some rocks to rest ourselves after our tiresome walk over the hills, to smoke a pipe and enjoy the scene around us. There were some labourers ploughing in the field close by, and I observed how steadily and neatly they did their work, nor did they appear to be in any hurry to leave off, although it was now getting late. I observed also that they were well dressed in blue cotton clothes, and wore the usual felt-soled cotton shoes of the country; and I made the remark, wherever I met with field labourers in China, there were none ever seen in tattered clothes, or badly clad.

While we were resting ourselves I fired my rifle at an object about 200 yards distant, and astonished my host by hitting the mark with such precision. He tried to hit the same mark with his matchlock, when it gave him such a kick in the face, the butt being held tight up to the cheek, that it capsised him and hurt him rather severely; he unfortunately loaded it with English gunpowder, which he fancied was inferior to his own, owing to the small size of the grain. Only that the poor fellow appeared to be hurt I could have enjoyed the affair, though

perhaps I should have congratulated myself that the matchlock did not burst.

On our way home we passed through the village, and created no small excitement among the inhabitants, all of whom appeared to turn out to see me; they were very civil, although their curiosity was great.

4th. — Bid good bye to my hospitable host, and started for She-Ling at an early hour of the morning; there was no appearance of frost, although thin films of ice had been found on pools of water the previous morning. Our road led in a south-westerly direction, not far from the foot of the hills, whose sides appeared remarkably precipitous for a considerable distance, and showed a strange horizontal stratification, some of the strata being as white as marble. This range of hills kept parallel to the road for about 50 lee, and then tended to a north-westerly direction. With the exception of one or two isolated hills of no great height, the country to the southward had the same level, plain-like character, and in some parts of our course the road was deeply worn below the level of the soil. Shortly after leaving our last resting-place we had to pass several streams, some of which were of pretty large size, and during heavy rains must be impassable torrents, their sources being in the neighbouring range of hills. They flowed over stony beds to the southward. Our road passed between two conical isolated hills rising abruptly from the plain; and here the range bent off to the north-west, taking a wide circuit of about 4 miles (12 lee). The country around was well cultivated, as before described. There was also much ground under tobacco cultivation, and long rows of leaves of the plant suspended from ropes to dry them in the open air, were frequently met with near their houses. The country people were tall and manly-looking, spoke with a good deep voice, and appeared to be rather partial to their whiskey.

While passing along the road I met with many carts heavily laden with large bales of dried tobacco-leaf on their way to Pekin and to the towns of the south. To one of these carts I observed a large, good-looking grey Arab horse, harnessed together with a mule and a donkey, three animals being very often placed aside in the fore part of a team. He and my steed immediately recognised each other by a mutual neighing, &c.; and I found on inquiry that this poor beast, so ignominiously reduced to labour and to such low company, was one of the horses of an Indian cavalry regiment employed in the campaign of 1860, and sold at Tien-tsin, on the regiment being sent back to India, to save the expense of retransporting them. This poor horse and the one I rode had probably been stable companions

together, but how different their lot! However, he might have met with a different fate, as many of these horses, who were in first-rate condition, were sold so cheaply that they were killed and disposed of as meat by the Chinese butchers to their people, who are by no means indisposed to eat horse-flesh whenever they can get it. We refreshed ourselves at mid-day at a road-side inn.

After a ride of about 8 miles over a flat country, well cultivated, with mountainous scenery almost surrounding us, we reached a walled city called E-cho-la, and passed by the road to the north of it. This portion (the northern) of the wall was only about a quarter of a mile in length, and had no city gate in it. On the right-hand side of the road I noticed a large building, enclosed in high walls, and was informed it was a yamun, or government office. Shortly after passing this place we were rather startled by the report of a matchlock not far off, and still more so by hearing a second report: we could scarcely make out what this meant. As it was now getting dark and a long distance before us, I could not spare time to make any enquiry, so proceeded on our way. The road here was in good order, and appeared to be well kept. Several people were employed in levelling and sweeping it, and on each side it was bordered by a ditch, much resembling our road-side ditches, so unusually met with in China. The scenery appeared very fine, owing to the close proximity of the hills. The road entered a very narrow opening in the hills, and again opened into a large valley with high mountain scenery all round. Just at the entrance to this valley there were some large buildings, which I afterwards learned were yamuns. There were a number of people assembled here, and, as I rode up, I noticed one man gesticulating very vehemently, evidently very much excited. However the people he was addressing appeared very anxious to see me, and beyond a continued stare as I passed showed me no incivility.

It was my intention, by the advice of the guide, to go at once to the yamun of the chief official and stop there, or in the vicinity of his residence; but my mule-driver, meeting with a friend of his among the crowd, and learning there was a good inn further on in a large village, we proceeded there instead. The crowd of people who assembled on the road-side and near the village was very great. While talking with them a white-buttoned mandarin made his appearance, and in a respectful manner said he was sent by his superior officer to enquire who I was? and where I was from? Where going? and what was my business? To these questions I replied by handing him my passport: he received it, and said he would return it to-morrow

morning. I asked him to give my compliments to his master, and mention to him that I would call on him to-morrow; he then left.

5th. Early this morning I was waited upon by the white-buttoned mandarin, who came to bring back my passport, but told me I could not get into the precincts of the tombs of the Emperor, and that his master could not even go there, nor could I go further in that direction, that it would not be very safe for me to do so, as there were a number of soldiers in the vicinity of the place who might be rude to me, or perhaps treat me very roughly, and on this account advised me not to stay any longer in the neighbourhood; in fact, he was in a great hurry to see me safe out of the place. He also said the mandarin declined to receive my visit, as he did not know exactly what business I had with him. I then proposed to walk up the mountain close by the inn, from which I could get a view, at all events, of the place, and told my servant to get him some breakfast at the inn, and afterwards we should see what I could. He said it would be necessary to ask his master for permission to do this, and that he would go to him and return with an answer. He returned in a short time with a favourable reply, and proceeding a short way up the hill I got a very fine view of the place. I saw at a distance of about a couple of miles the yellow-tiled roofs of two of the Mu-Lings or mausolea of the Emperors of the Tsing dynasty in a large walled enclosure. It was so thickly wooded I could not distinguish the other four. Altogether there are six Emperors buried there, viz.:

1. Shunchi ..	reigned	18	years,	dates from	1644
2. Kanghi ..	,,	61	,,	,,	1662
3. Yung Ching	,,	13	,,	,,	1723
4. Kien Lung.	,,	60	,,	,,	1736
5. Kia King ..	,,	25	,,	,,	1796
6. Tau Kwang	,,	29	,,	,,	1821

The Emperors Kanghi and Kien Lung are the most remarkable and interesting to us, on account of the patronage given by the former to scientific Europeans who taught the Chinese astronomy and carried out a grand survey of their country. They also encouraged the literature of their country to a great extent, and the latter received embassies from Holland, Russia, and England. The high wall of the southern margin of the enclosure appeared to extend for about a mile in a straight line; about midway there was an ornamental entrance, and in the distance behind, forming a background, there was a high range of thickly-wooded and rocky mountains.

While passing out of the valley through the narrow entrance

I observed, on the hill not far from the yamun overlooking the road, a respectably dressed old Chinese gentleman seated on a chair, with one or two attendants near him. He evidently came there to see me, and on inquiring from the guide who he might be, he suggested that it was the chief mandarin of the place, who was too proud to receive my visit, but who gratified his curiosity in this furtive manner, and I cannot but think at the expense of his dignity also: we soon had the road to ourselves as none of the people cared to follow us further.

Taking advantage of a turn of the road which led more directly south we followed it; it led to part of the western suburb of E-chow, which had the usual dingy appearance of the suburbs of a Chinese town. There was a very fine Tsai or pagoda in this quarter, but it had nothing remarkable about it except its height and close proximity to the wall of the city. A very dull place, and of small size, its principal trade consisting in the purchase and sale of tobacco grown in the surrounding district. As the day was not very far advanced we determined to get out to the high road to Pow-ting-Foo, and not stop at E-chow.

We had not proceeded far when the atmosphere became so very dusty we could hardly distinguish the hills and mountains distant about a mile or so on our right hand. We were in fact encountering one of those remarkable meteorological phenomena called by the Chinese Qua-Fung, or dust-storms, so common in North China at certain seasons of the year; and are most disagreeable, not only on account of the dust which penetrates clothes and books, and soils all furniture, &c., but on account of the disagreeable sensations experienced by the body, partly owing to the dry condition of the atmosphere, and partly to electricity. However modified this may be in China, they are no doubt of the same nature as the Tebbad or dust-storm of Central Asia, so admirably described in Mr. Vámbéry's recent work.

Towards evening we passed through a very deserted straggling-looking village. We passed over a space of about two miles, which had very much the appearance of being subject to great floods, and had probably been a river-bed. Further on, the ground was more uneven, and at times the road was so much below the level of the fields on each side that it was necessary to get out of its track to see the country. This was attributable to the strong winds and the loose texture of the soil. Towards evening we reached a large village called Yun Tsun, where I found an inn.

6*th*.—Our road led through a perfectly level country, very

highly cultivated, and high ranges of mountains were visible to the westward, gradually disappearing in a south-westerly direction.

The road we were now travelling on was an open track-way, sufficiently broad to admit several carts to travel abreast. There were several guard-houses, at intervals of about a quarter of a mile from each other, throughout its course. They were very simply constructed, of a square form, with a door, and sloping roof, and had a kang inside, on which three or four men could sleep. There were larger guard-houses, resembling military stations, at farther intervals. They were necessary to protect the large traffic along the line from being disturbed by banditti, who would otherwise frequent it.

After a long, bleak, and monotonous ride along this road, without meeting anything to excite our attention, except these guard-houses, and occasional villages in the distance surrounded with clumps of willow-trees, we at length observed the outline of a long crenelated wall, rising before us in a southerly direction, just as it was commencing to be dark. This was the first appearance of the long-wished-for city we were so anxious to reach before nightfall. We passed through the main street in almost a straight line to near the east gate, and, turning to the right, we at length found ourselves in the yard of an inn of large size. I got a tolerably comfortable room to myself, but was obliged to send to an eating-house in the neighbourhood for my meals. I was immediately waited on by two Yamun officials, who appeared very civil, though very inquisitive; and, among other questions, asked if I had brought any books for distribution among the people, referring to missionary tracts. I gave them my passport, at the same time requesting that I might have a guide sent to me. Later in the evening a man, not in official dress, but accompanied by five Yamun men, wearing the distinctive hat, waited on me, and presented me with my passport, saying also that he would call on me to-morrow and accompany me through the city. He told me that the city had a large population, nearly as large as that of Tien-tsin, and that it was the prefectural city of the province. He said that two missionaries had been there lately distributing some books, and mentioned the names of Messrs. Edkins and Blodget. He also mentioned that he had known me by repute, having heard of the hospital at Tien-tsin, and that many of the people of the city had been to it.

7th.—My guide called on me at an early hour, when we set out to see the city. I was much surprised at the long streets we passed through, and the clean and tidy appearance of the place.

The atmosphere was quite clear from the abominable odours encountered in Chinese cities in general, and there were many good shops and houses, showing that the place had considerable business. Some of the drapers' shops were particularly fine and well stored with goods, and the apothecaries' and tea shops looked very respectable. My guide brought me to a place where some stalls were erected for displaying goods for sale. It was in the vicinity of a large public building, where there were several open courtyards. I learned it was a market or fair that was being held here, and that people brought their goods from distant places. I found large quantities of felt carpets, generally about six feet in length, by four or five wide; though there were some large enough to carpet a large-sized kang, they being intended for that purpose. They came from beyond the Great Wall, and were made at a place called Chang Chi Kow, on the borders of Mongolia. There was also a large display of furs for winter use; chiefly white and black lambs'-wool skins, fox-skins, wolf-skins, wild-cat, sheep-skins, goat-skins, squirrels, ermine, sable, and unborn camel, and one or two tiger-skins; large quantities of foreign cloths, both wool and cotton, and cloth of native manufacture, white and dyed blue or black; also silks of home manufacture, ready-made clothes, &c. There was also a curiosity shop, very neatly arranged with jars of crackled and other kinds of old china, cups, bowls, plates, bronzes, enamel vases, &c.; jade ornaments, scroll-paintings, and some beautifully illustrated manuscript books; besides inferior Chinese crystals, gems, glass imitations, and an innumerable catalogue of what are generally found in Chinese curiosity shops.

I found the north gate of the city in the protection of the most unmilitary-looking guard it is possible to imagine, and passing through it I found, at the distance of about 400 yards from the crenelated wall of masonry, a crenelated mud breastwork, which appeared to be carried all round the city wall. There was a canal-like river in front of it, and the bridge I crossed over had a defensive work on the further side. The houses of the northern suburb extended along the road, and were considerably above it, the road having been worn away by the wind or rain, and the constant traffic of carts upon it.

At first the day promised to be fine and warm, the sky being free from clouds; but as we advanced on our journey we became enveloped in a dust-storm, or Qua-Fung, and the wind from the westward increased to a gale. Towards evening it became intensely cold, and though I was well covered with warm woollen clothes, consisting of flannel shirt, cloth waistcoat, coat, and thick pilot overcoat, I felt the cold penetrate to my skin. While

the storm was at its height we met several carts, on each of which there were about ten men, in such miserable plight from the cold that they hardly noticed me as we passed. Though they appeared to have no military arms with them, and were in plain clothes, they were soldiers, proceeding from Tien-tsin and other stations to Pow-ting-foo to join the army engaged in operations against the Nien-fei rebels of the neighbouring province of Shan-tung. They were covered with dust, and nearly all of them wore goggles over their eyes, to protect them against the fine penetrating particles of dust, which is the cause of that vast amount of eye diseases which we find the inhabitants of the north of China especially subject to.

Reaching a town called Gna-shu-sha, we were glad to find an inn in the eastern suburb, being in a miserable plight from cold and fatigue; we had ridden 50 lee, or about 17 miles, without resting.

8th.—Started from the inn at Gna-shu-sha at an early hour of the morning, which, though fine, with bright sunshine and a clear atmosphere, felt piercingly cold. There was ice on the pools of water, and frost on the ground. The suburb had a very dilapidated appearance. The city wall was in the form of a parallelogram, longer in its north and south sides than in its east and west. The latter did not appear more than about 400 yards in length. In many parts it had fallen down, so that it afforded no protection to those living inside. It appeared to be a fit symbol of the moral reputation of the place.

Beyond this town the country appeared more undulating; the soil was light and sandy. Our road did not proceed in a straight line, but, on the whole, tended in a north-easterly direction till we reached a bridge, crossing a river about 150 yards in width. The bridge was narrow and made of wood, and was supported by numerous trestles of stout spars, rising to a considerable height above the water. Proceeding a short distance along the northern bank of this river, named Pei-ko-ho—and no doubt it has its origin in the few streams I crossed over at Ta-si-woo, close to the western hills—we entered a village of considerable size and trading importance, named Pei-ko. We passed over a bridge of masonry in the middle of the town, and found a large number of narrow boats moored along the quays at each side, and a considerable quantity of coal stored there. There were a great number of boatmen, who were engaged chiefly in the coal-carrying trade; this river, the Lee-ho, being navigable for their narrow boats to within a short distance of the coal-mines.

We proceeded by the road still in a north-easterly direction, and towards evening met with a long procession of men and

priests, and numerous carts laden with bricks and tiles and timber. There appeared to be about eighty of them, and the procession extended about two miles. In about the middle of it there was a colossal figure in a sitting posture, dressed in red robes, and holding a scimetar in his right hand; his face was painted blue, and his prominent staring eyes and defiant look gave him a most diabolical expression. He was called Er Long Ye, meaning Son of the Wolf. He was supposed to have great influence over rain, and was intended as the tutelary deity of a new temple that was being founded in a village in a farming district distant about fifty lee, and had been carried a couple of hundred lee from a large temple, of which this was possibly to be a detached connexion or offshoot. He was carried on a platform supported by sixty men, and a man stood behind holding over him a large red umbrella of state, similar to those seen in the processions of mandarins of high rank. The bricks, &c., were intended to lay the foundation of the temple, which my guide informed me would be done with some necromantic ceremonies and jolification.

Proceeding a few miles further on we came to a village called Shako, at which a fair had been held that day.

9th.—Morning cold, but as the day advanced it became warmer. Our road led in a north-easterly direction through a country mostly cultivated with cotton. Took breakfast and rested at a wayside inn at a village called New-Toso. Found the place also very busy with a fair that was being held. There was much cotton in large sacks, and I also observed some oxen and ponies exposed for sale. Occasionally large herds of oxen are to be met with. They come from beyond the Great Wall, where they are to be found in herds of considerable size feeding on the pasture-lands of Mongolia. These oxen are in great request in the north, being commonly used as beasts of burden and for agricultural purposes. They have some resemblance to the European kinds, and, besides being coloured and marked like them, they give a full-toned note when they low, which is almost sufficient to denote a common kindred. They are not inferior in size, and are probably stronger and larger boned animals. They are apparently a clumsy, heavy-headed, and coarser species. These characters being dependent on the prolonged severity of the winter season of the north of China, of late years numbers of these animals have been imported into Shanghai from the north of China to supply the military commissariat; and during the expeditions against the Taipings in the interior, they accompanied the force to supply the troops in the field with fresh meat. On these occasions they would be

Sketch Map of BELUCHISTAN and EASTERN PERSIA

to accompany the Papers by

Col. F. J. Goldsmid, C. B.
and
J. W. Barns, Esq^re C.E.

Geographical Miles
50 100 150

English Miles
50 100 150

Col. Goldsmids route

Published for the Journal of the Royal Geographical Society by J. Murray, Albemarle Street, London 1867

Edw^d Weller

allowed to graze on what appeared to be good grass growing on the fields which had lain uncultivated for two or three years. It was remarked that these northern cattle would pine away and die, and on examination of the interior of the animal large tangled masses of grass were found obstructing the intestines.

After a smart ride of about 12 miles I found myself at the residence of my guide, who took the opportunity of revisiting his family on our return home. Feeling myself rather unwell I was quite indifferent to this arrangement, as I knew I was within easy distance of Tien-tsin, to which I was anxious to return.

I was much struck at the cold greeting of the family on the guide's arrival; the expression "have come" (lai leou) was said by the mother, and the same repeated by the son. The weather feeling very cold, and being rather unwell, the family made me as comfortable as possible, and managed a warm bath for me, so that I was able to move on my journey the next day by reclining on my bed in the cart. The road soon turned on to the embankment already alluded to, only on this occasion it continued more along its course till near the ferry over the western river.

On entering Tien-tsin I found the narrow streets crowded as usual, and what struck me as strange was the frequent collections of men, women, and children, eagerly looking through stereoscopes exhibited by strolling showmen at the rate of one cash for seeing each slide. This was a strange evidence of the rapid progress of Western civilization.

XIV.—*Notes on Eastern Persia and Western Beluchistan.*

By Colonel F. J. Goldsmid, C.B., F.R.G.S.

Early in 1863 I had the honour of submitting to the Royal Geographical Society some notes of an exploration, made during the previous year, along the coast of Eastern Beluchistan, a tract of country comprised between 62° and 67° E. longitude, and little known to Europeans. I had proceeded from Kurachi westward, with a view of arranging for a coast-line of telegraph; but circumstances prevented me from continuing the route beyond the port of Gwádur, and the orders of Government necessitated my return thence to India. The close of 1863, however, was favourable to a resumption of the deferred journey, and in December of that year I found myself engaged in an enquiry which promised to supply new information of interest on the

western shores of Mekran, or that portion of Beluchistan situated between 56° and 62° E.

It so happened, however, that at this particular period the late lamented Colonel Patrick Stewart was about to lay the telegraph cable in the Persian Gulf. Telegraphic communication with India had not become a *fait accompli*, as at present, and was looked forward to as an object of primary importance. Instructions to accompany the telegraph expedition took me away from the Mekran coast; and personal acquaintance with the scene of intended exploration became limited, on this occasion, to a hurried unceremonious visit to Choubar and Gwettur, small ports west of Gwádur. A brief description of these places is given, to supply what might otherwise appear a wanting link in an overland journey from the Caspian to Kurachi, of which the completion would be shown by making the paper read in 1863 a sequel to the present.

On the 4th February, 1864, I took leave of some pleasant companions in H.M. steamer *Victoria*, then lying off the Mekran coast, in quest of soundings for the cable, and, between three and four in the morning, dropped into a native fishing-boat to make my way to Choubar, distant from 25 to 30 miles. We reached it at about 9 A.M.

Our boat's crew were twelve in all, including myself and servant, with Háji Abdu, an old acquaintance whom I had hired as a guide at Gwádur. Our appearance was, therefore, not very imposing, and, when the landing was effected, my suite was reduced to a single individual, the Háji. We were received by a Muscat Khwoja, and an Arab of the Wáli's retinue, escorted to the town, and presented to the Chief himself, who sat awaiting us by the gate of his fort. A number of people crowded around, the usual salutations were made, the usual questions asked and replied to, and I entered upon business. A certain reserve, which I had seemed to notice in the first instance, gradually wore away, and nothing could be more friendly than the advanced stage of our meeting, which was finally dissolved by the introduction of halwa and coffee. The next process was to take me to a garden where halwa was re-introduced, and I had no resource but to add to it figs, walnuts, and cocoanuts. Here we stayed for some time, in pleasant conversation, the Wáli's son and the Khwoja acting hosts with true Arab gusto and hospitality. The latter, in addition to his native Arabic, spoke Hindustani and Persian readily, and was a man of more knowledge of the world than might have been looked for in this particular locality. He farmed the Choubar revenues from the Imaum for a fixed yearly sum.

The village of Choubar is situated on a sand hillock in a small

bay of irregular shape, formed by the two points, Rás Tiz, north, and Rás Choubar, south. The latter, though quite insignificant in height, is audibly acknowledged by the impetuous rush of water around it, and marks the eastern entrance of the large bay whose name it bears. It is placed by Horsburgh in latitude 25° 16′ N. and longitude 60° 35′ E. The same authority calls the bay of Choubar "one of the best on the coast;" but the further statement that the town itself is "the best on the coast," is certainly not supported by the *primâ facie* impressions of a personal inspection. The fort may be larger than that of Gwádur, but is only remarkable from its contrast to the mat-huts around it, and, if found among other mud-buildings, would attract no more attention than any ordinary village structure or enclosure. The huts are perhaps a little more compact than the huts at Gwádur; but these last having been hurriedly put up since the fire of November, are now seen to disadvantage. There are certainly more trees in Choubar, and there is something more like garden cultivation. The cocoanut, olive, and mango were conspicuous, and yet not alone; and it was refreshing to see the familiar well, waterbag, and watercourse, however primitive. I observed little which seemed to require especial note. Perhaps the mausoleum of Peer Hyder at the point, and the Khwoja's shrine north of the town, are as remarkable objects as any.

The population is but small. The number of houses has been given to me as 225, and I should compute roughly their inhabitants at about 900, although the Bunnya's statement, as follows, is not so liberal:—

	Houses.	Occupants.
Mêds	30	80
Bozdars	40	80
Kedjis	30	85
Tizis and others	40	100
Shiris	40	100
Khwojas	10	30
Bunnyas	5	15
Hamalis	30	70
Total	225	560

The Wali, or Governor, Rashid, has his ten Arab attendants; but the protection of the place is left to others. The yearly sum for which the revenues are farmed is said, on good authority, to be 6000 rupees. Its disposition is important, as showing the relations of the Imaum and his Mekrani neighbours:—

Rupees 900 to Din Mahomed of Bahu, for protective purposes.
„ 200 to Mir Abdullah of Gaih, for ditto ditto.
„ 1,000 to the Wali in charge.
„ 3,850 Balance, to the Imaum, after defraying cost of establishment, incidental expenditure, &c.

Ghee, cotton, wool, goat's-hair, mat-bags, moong, and jowari, are brought in from the interior, a levy of 5 per cent. being exacted on export. A very recent rise of $1\frac{1}{4}$ per cent. is shown in this account. Imports from Gaih, Bint, and Kussurkund pay $1\frac{3}{4}$ per cent.; but no charge is made from those of Báhu Dustyari. Rice, dates, and wheat, come in for purely local consumption.

I procured a boat for the *Victoria*, and tried to purchase some half-dozen sheep to send in her, but none were to be had except at a day's notice. In a day they could get me as many as I pleased. From all I could gather, it appeared that an ample supply of provisions might be thus obtained at any time; but a short previous intimation was always necessary. Báhu is a good and convenient depôt. According to Kinnier, it is distant 22 miles from Choubar, and on the direct road from thence to Kedje. The same authority, quoting from Lieutenant Grant, places Gaih at about 80 miles, but in a line more directly north than Báhu, which is to the eastward. Its position was pointed out to me by a boatman when we sighted the bold picturesque hills north of Choubar Bay. He also showed me the salt-yielding hill of Páreg: but Lieutenant Grant's "Neem Khor," at its foot, he would only recognise as the "Namek" or "Nimek Khor," or Salt River.

Tiz, the ancient "Tiza," is divided from the low sand hillocks of Choubar by a range of hills, in height about 400 or 500 feet, through which there is a road to the village. There is little left to mark its former importance. Doubtless its prosperity rested much upon a river which, wherever it rose, issued out to the sea at the spot now known as Kenj Khor. Not a boat was, however, to be seen; in fact, there was no bunder or landing-place, but a shallow anchorage, necessitating the use of canoes to those who were not inclined to wade some 300 or 400 yards in the water. The Persians have a strong desire to revive this port, and are supposed to be building a fort there. I had intended to land, and took a guide accordingly from Choubar; but on rounding Rás Tiz I found the village so distant, the shore so deserted of inhabitants, and the ascent of the hills a matter of so much time, that I contented myself with a reconnaissance from the boat, and moved off to sea again.

Night set in soon after we had passed the Choubar headland and got clear of the bay. The *Victoria* lay at anchor in the distance, but we did not speak her. In the early morning we were at Rás Bris, near to which the Choubar territory is said to extend. Bris is a repetition of the Mekran cliff, visible at the Malan, and all along the coast. It has a long seafront of several miles of crumbling but smooth sandstone, whitish in colour, but

capped by a flat, thick, regular brown crust. It has also a bluff irregular cape, giving a sheltered nook to fishing-boats on the west, and a smaller projection to the east. To the traveller from west to east this is followed by low hills of loose white sand, with, for the most part, a good beach. A long hill, called Drammoke, and one of different shape, called Prichuk, are succeeded by Cape Farsa and Farsa Island, the entrance of the large Gwettur Bay, on the westward. On the sea face of the cliffs, near the extremity of the Cape, is a spring of sweet water, much used by kafilas and passengers to and fro. About here, too, I saw to the southward, distinctly but far beyond hailing distance, the three steamers, *Coromandel, Zenobia, Semiramis,* on their way with two sailing ships from Gwadur to Mussendom, successfully dropping the cable which was to form part of the great electric chain of communication—it may be, too, of civilisation—between England and India.

Gwettur is a poor village of about 70 mat-houses and 250 inhabitants. It is situated near the north-west corner of the bay of the same name, hidden to the south-west by the rocky projections which separate it from the beach behind Cape Farsa. I arrived at about 3 P.M. on the 5th February, landed, and after looking about me, sat down for a time with the respectable old men who are hereditary heads of the community. Háji Morád, Bussole, and Mithano, are as patriarchs in this cluster of hovels. They received Háji Abdú, my guide, as an old acquaintance: my own reception was as cordial and friendly as could have been expected. One of the three brothers spoke Persian and Hindoostani fluently, so we had no difficulty in becoming mutually intelligible.

Háji Morad pays 400 rupees per annum as farmer of the Gwettur revenues. But there is scarcely a bunnya in the town, nor a shop or storehouse. The inhabitants are called Mêds, Durzádas, and Raises. The fisheries may be considered to be the only true source of revenue, and I noticed some boats in the mouth of the little Gwettur River below the village. Some also were sailing about the bay. No wish was apparent to conceal from me the politics of the country. While sitting together in conclave on the mat outside their door, the old men spoke to me with freedom, and heedless of the many listeners grouped around us. The village was both dirty and desolate, and my stay there was not prolonged.

From Gwettur we made a splendid run across the bay. Its northern shores are remarkable for the Báhu River, traced in the distance by dark lines of mangrove, the Derembole Hill, and the Dusht Khor, situated between the Derembole and Jevui.

Passing Ghunse and Pishkan during the night, we reached the gun-boat *Clyde* at Gwádur at an early hour on the morning of the 6th February.

Deferring, for a future occasion, the narrative of some weeks spent among the Arabs on the opposite shores of the Gulf, and at Fáo (or Fava) near the mouth of the Shatt ul Arab, a month at Baghdad, an overland journey from Baghdad to Izmid, on the sea of Marmora, a residence of some months in Turkey, and a journey from London to Teheran, *viâ* Russia and the Caspian, I will now come to the past winter. At this period, after an experience of four months at the Persian capital, I was preparing to return to India by a route little frequented by Europeans — but one which I had long contemplated taking, should opportunity offer, to enable me to complete my reports on Beluchistan, and supply the requisite information west of Choubar. I could now attempt to reach that port from the Persian side, and with the knowledge and consent of the Persian Government. A route for the Indian telegraph was required in that direction as an alternative to the submarine cable, and no such route could be determined without sure and personal knowledge of the country to be traversed.

I was fortunate in obtaining, as a companion for the greater part of this journey, Major Murdoch Smith, of the Royal Engineers, an officer who had done good service in restoring many valuable antiquarian relics both in Asia Minor and on the north coast of Africa. His labours in the last-named locality have resulted in the beautiful collection of Cyrene monuments now exhibited at the British Museum, which will, it is hoped, become better known when better accommodated. It was arranged that we were to proceed together as far as Kirman, and thence to take separate routes—he to Bunder Abbas and the coast, and I to Bampur and the interior of Mekran.

We left Teheran on the 4th December, 1865, meaning to make our way to Ispahan, about 260 miles, as quickly as possible. So much has been said and written about "Chappur" rides in Persia, and this particular section of the country has been so often and so well described, that I will not dwell upon the part of our journey performed with post-horses. But travellers require an amount of patience and tenacity of purpose for these things far beyond the scope of what is usually considered "roughing." It is all very well to imagine oneself galloping along at the rate of 10 miles an hour in a fine bracing climate, pulling up at a post-house, and dining and sleeping as well, through hunger and health combined, as at the Mirabeau or Clarendon; but there is another feature in the picture which should not be forgotten.

You ride with your kit, or a great portion of it; you are not actually compelled, it is true, to carry books, bedding, and beer, yet are they very acceptable accompaniments when the ride is over, and worth a little temporary additional inconvenience; but there are other articles which climate and circumstances render indispensable, and these are not favourable to speed or comfort, especially when the rider is rather heavily attired in respect of cap, coat, corderoys, and boots. Then it is to be borne in mind that the horses are not necessarily fast because used for posting. Some move along heavily and lazily from first to last; some require great tact and effort to be brought into action at all; and some have actually no go in them. Nor is it uncommon for the "Chupper" horseman to get a cropper. He should avoid all sudden rises in the road, because the descent is dangerous to the "Chupper"-horse in motion; and this course, difficult at all times, is at night impossible. My comrade and I rode animals of all kinds, but were, upon the whole, fortunate. Indeed, our last day's ride took us about 60 miles into Julfa, the Armenian suburb of Ispahan, by mid-day, or in time for breakfast.

At Ispahan we were detained about a week, and thence commenced our march, by comparatively easy stages, to the eastward. Accompanied by five Persian servants, we had not much to apprehend as regards physical wants or privations, at least within the limits of acknowledged Persian territory. However merciless in extortion and determined in falsehood, the Persian servant, in his own country, displays a surprising amount of zeal, energy, and activity in his Feringhi master's cause. He ignores all prejudice—knows no difficulty of service: it is only when he finds himself among strangers who cannot appreciate his authority, that his heart fails him, and he sinks to the level of ordinary humanity. Among those who now attended us, one, a "pahlivan," or wrestler, was a fine specimen of his countrymen, most assuredly the handsomest of all Oriental races.

Major Smith's Diary is part of the Government Records, which will, I doubt not, be made available for general reference. My own will be placed at the disposal of the Royal Geographical Society. Availing myself occasionally of the former, I will now briefly describe the route from Ispahan to Kerman, and any remarkable features or places in it.

"The road from Ispahan to Yezd consists of three natural divisions. 1st, 50 miles or nearly so in an easterly direction, over the flat plain of Ispahan; 2nd, 30 miles in the same direction over hilly ground, the continuation, evidently, of the great range of hills that passes by Koom, Kashan, Kohrood, and Natenz; and 3rd, 120 miles in a south-easterly direction over an off-shoot of the great plain of Khorasan. Coming from Teheran to Yezd by Ispahan, one is consequently obliged to cross the Kohrood range twice, first at

Kohrood itself, where the hills are high and rocky, and frequently impassable from snow in winter, and secondly 50 miles to the eastward of Ispahan, where they are much lower and less precipitous; whereas the direct road from Teheran by Kashan and Nain is over one continuous plain."

We made out the distance to Yezd in ten marches. The weather was for the most part favourable, but at times bitterly cold. Cultivation is sparse and uncertain, population scant, and traffic of no great account, though continuous. There are signs of life and agricultural activity as Yezd is approached along the Kashan road. At Maibut, where we passed our Christmas, the soil is good for building and pottery. I bought some samples of the latter, which resembled the common Indian "kúza," or earthenware water-jug. In this neighbourhood are clusters of large villages, such as Ardekoh, Bafroh, Ahmedabad, Sarfabad, Turkabad. The view of the hills on either side here becomes worthy of note. On our right they are but a few miles distant, and we open out a new and picturesque range as we advance. On the left they are separated from our road by a desert plain, some 50 miles in breadth. Sloping upward from a low valley like the bed of a river, they rise gradually on the further side into regions of snow. I never saw scenery of this kind to greater advantage than when watching the higher of these mountains an hour or two before sunset, as we entered Maibút. The clouds had cleared off from the crest, and left it to stand out in exquisite relief on a soft Persian blue sky; but below the crest was a belt of dark cloud like Saturn's ring. The base of all the hills, again, was more or less covered with mist and snow. The effect was grand; and, as the sun got lower, a lurid red glare fell upon the scene, which varied it agreeably.

The fine solid caravanserais of Shah Abbas on this road are remarkable structures. Their use to merchants, pilgrims, travellers, and wayfarers generally, is, indeed, great, and as architectural monuments they are worthy of any age or country. In contrast to these noble works of an enlightened monarch are the many ruins resulting from the invasion of Mahmoud the Afghan.

Yezd is a large town or city, situated in a sandy plain, high and open, between two ranges of mountains, running from north-west to south-east, as a general direction. To the westward is the open country from Kashan: eastward, an apparent desert, dividing Yezd from Seistan, and little traversed by man or beast. On the south the mountains can boast of peaks towering to some 7000 feet above the plain: sharp, bold, rugged, and fantastic; tipped, tinged, or covered with snow, according to nature or position; presenting at all times a beautiful view, and worthy of

more notice than a faint line, or a blank in our best of maps. Yezd may have about 40,000 inhabitants, of whom 3500 are Ghebirs or Parsis, and 1500 Jews and non-Mahomedans. There are 17 Hindus only; but this number is sufficient to show that toleration is practised to some extent, without respect of race or creed. Silk is here manufactured, the raw material being obtained in the neighbouring villages; but it is probably inferior to that of Ghilan. It is an article of export, as also henna, dyes, cotton, and nummuds (felt carpets). Wheat is imported, although cultivated in patches around and near the town. The streets are wretched and blank, like those of most Persian towns, but not especially dirty. There must be about fifty mosques, of which the Juma Musjid has a fine high frontage, overlaid with the pretty blue tiles so common at Teheran. The supply of water is precarious, and depends on the season. If snow or rain be plentiful it is well for the inhabitants; otherwise there must be scarcity. The merchants of Yezd seem to be an enlightened and enterprising class. We made the acquaintance of their chief, called the "Mullik u Tujjar," a very fine old man, with an aquiline nose and sharp twinkling eye, wearing a large becoming turban. They informed us that their dealings were not confined to Bombay and India, but extended to the Mauritius, Batavia, and China. I quote some passages from Major Smith:

"The greater part of the town is built outside the city wall, and the Governor lives in a separate fortified enclosure of his own. As in almost every town in Persia, ruins are superabundant. The inhabitants account for this, first by the Affghan invasion nearly 150 years ago, and more recently by the rebellion of one of its Governors, whose history is perhaps sufficiently interesting to be shortly related.

"During the reign of Fath Ali Shah, in the beginning of the present century, Yezd was governed by one of his numerous sons, Mohamed Wali Mirza, who, in course of years, had amassed an unusually large fortune, even for a prince. Called, probably on this account, to Teheran by his father, he left his government, his harem, and his money in charge of his Vizier Mirza Abdul Rezak, who, during the absence of the Prince took possession for himself of all that had been entrusted to him, raised an army, and became Yaghi or rebellious. The Shahzadeh on his return from Teheran being refused entrance, brought a force and besieged the city. After a long defence, during which the city was almost destroyed, Abdul Rezak was forced to flee, first to Kirman and then to Meshed, where he took *bust* or sanctuary in the sacred shrine of the Imam Reza. Here, of course, he might have remained in safety, but he was induced by Abbas Mirza, the heir apparent to the throne, to leave his refuge and throw himself at the feet of the King. Disregarding the promises of forgiveness held forth by his son, the Shah ordered the wretched Vizier to be given over to the vengeance of the harem he had dishonoured; when the women, armed with bodkins and scissors, speedily put him to an ignominious death.

"Nothing could exceed the civility with which we were treated by the Governor, Mahomed Khan, General Adjutant (as he is called) of Persia. On

approaching the city we were received with an Istikhbal, or reception, by a large party of horsemen and soldiers headed by the Governor's steward, whom he had appointed our Mehmandar or host. More soldiers and ferrashes were sent to escort us through the bazaars, which were crowded with people to see the strange Feringhees. The house assigned us for a residence was the palace of the very Mahomed Wali Mirza whom I have already mentioned. Here we were entertained during our stay in Yezd by our Mehmandar as the guests of the Governor. We called on the latter twice, and found, not a little to our astonishment, that he spoke French, and had visited almost every capital in Europe. When tea was brought in he remarked that, as Englishmen, we would no doubt prefer beer, and a bottle of 'Allsopp's pale ale' was immediately set before us.

"The distance from Yezd to Kerman is 240 miles of good level road over a continuation of the same plain as that between Yezd and Kashan. About half-way the road turns from a south-easterly to an easterly direction, the last three stages being on the road from Kerman common both to Yezd and Shiraz. The greater part of the way the country is perfectly barren and desert, although great improvements have of late years been made by the present Vizier of Kerman Mahomed Ismail Khan, better known by his title of Wakil-ul-Mulk. He has built caravanserais and made reservoirs of fresh water in the places where they were most wanted, and has encouraged others to follow his example."

Of the twelve stages into which the road was divided, the first, Mahomedabad, is a long street of low houses, with a row of mulberry-trees on either side, and many watercourses. There are gardens around, and the country is well cultivated. Judging from the number of spectators assembled to stare at us (and every available man, woman, and child, must have been turned out), the inhabitants should not be much less than 1000. Our host to-day was the son of a noted Yezd official, styled the Nazim u Tujjar. He was a respectable, portly youth, and entertained us in the usual hospitable manner. Some notion of the dinner, when we chanced to be received as guests at a Persian's house, may be gathered from the following bill of fare, which I find carefully recorded:—Rice in profusion, and well boiled; fowl stewed with prunes; minced meat; the same fried into flat cakes; pigeons and game birds swimming in grease; chickens roasted to chips, salt and dry; scraps of good cheese with herbs; and excellent fruit. On one or two occasions we had soup, which would have been good if warm. Few large towns in Persia but can furnish drinkable wine, and trays of sweetmeats in variety and profusion are seldom wanting. At Yezd I counted no less than twenty-three plates in the antechamber; while the apples, pears, oranges, and pomegranates, might be reckoned by hundreds.

"*Sir-i-Yezd*," our second stage, is the boundary village of the Yezd district. It has a good caravanserai, and the ruins with the background of hills are picturesque. "*Zainu Din*" is but

a caravanserai and post-house; the first a solid hexagon of burnt brick, well fortified, and almost luxuriously constructed for public convenience. It is of the time of Shah Abbas, but the dilapidations do not appear to be the result of age. Assaulted by Bukhtiaris, and possibly other robber or hostile tribes, its strength has prevented more than partial injury, and it might still be turned to account for the defensive purposes of which its thoroughly isolated position is suggestive. "*Kirmanshahán*" is much the same as Zainu Din, only the caravanserai is a new building. The next place, "*Shems*," is even more desolate than the two preceding stages. Its post-house had been broken into not many months before our visit by the Bukhtiaris, and was doorless and empty; but we found tolerable shelter in an old fort. "*Anar*" is rather a picturesque village in the distance, and quite an oasis in respect of cultivation and the necessaries of life. "*Beyaz*" has about twenty houses, an avenue of trees, and a new caravanserai. "*Kushkuh*" may be recommended for its excellent bread and water. The ninth stage, "*Bahramabad*," is the centre of a comparatively flourishing group of villages, and shows signs of progress and prosperity. Wheat, cotton, and castor-oil, are abundant. It may be mentioned as a remarkable instance of the effect of the late commercial crisis upon these out-of-the-way parts, that the price of cotton had gone down about 70 per cent. on its value a few months before our visit. "*Kebuter Khan*" and "*Baghin*" are respectable villages in their way, but need no particular mention. The next stage is "Kirman;" regarding which, and the road in, I will again quote from Major Smith's Diary:—

"Somewhat to our astonishment we found Baghin actually to the southward of Kirman, which quite accounts for the mistake made in the maps. In most of them the roads to Shiraz and Yezd are marked as quite distinct, whereas, for the first three stages, they are one, and only separate at or near Kebuter Khan. The maps have evidently been drawn from verbal report, as the three names of Baghin, Robat, and Kebuter Khan, with slight variations of spelling, occur on both roads. Four or five miles from Baghin, the road, after a gradual ascent, rounds the point of the Dawiran range from which it descends into the plain of Kerman, leading to the city in an E.N.E. direction.

"Three or four miles from the town we were met as at Yezd by an Istikhbal sent by the Vizier, the Wakil-ul-Mulk. A comfortable house was assigned us next to his own, and a Mehmandar appointed to attend to all our wants.

"Kirman is situated in an extensive plain, but in the immediate vicinity of very lofty mountains. The climate is said to be excellent, neither very cold in winter nor hot in summer. Its height above the level of the sea I should estimate at about 5000 feet. The city in many places is a mass of ruins, caused, I believe, by the civil war on the accession of Agha Mahomed Khan, the first of the Kajar dynasty. Kirman, like many other places in the south

of Persia, followed the fortunes of Lutf Ali Khan, the representative of the Zend family. After a gallant defence, Kerman was taken and almost destroyed by Agha Mohamed Khan, into whose hands Lutf Ali Khan also soon after fell not far from Bam. Much has, however, been done within the last seven years by the Wakil-ul-Mulk to restore the city. The walls have been repaired, new gates have been built, and inside the town bazars and caravanserais are in course of erection. On the southern side of the town is the Ark or citadel, in which the Governor resides. It forms a complete enceinte in itself, although the inner wall of the Ark is also the city wall.

"During the four days we remained at Kerman, we went to see the carpet and shawl factories. The carpets are the finest in Persia, and the shawls are considered next in value to those of Cashmere. Both are made entirely by hand, without the use of even a shuttle. In making the carpets, the threads (all of one colour) forming the length of the web are stretched on an upright loom consisting of two horizontal rollers. The cross coloured threads that form the pattern are worked in by as many small boys as the breadth of the web will allow to squat in front of the loom. As the work progresses the web is gradually rolled up on the lower roller. After two or three rows have been worked, wide-teethed combs are inserted in the woof and hammered down with a mallet to make the carpet close and firm. The master-weaver draws and colours the designs on paper, ruled to represent the different threads; after which he teaches the pattern to the pupils, who commit it to memory. The shawls are woven in a similar manner, almost the only difference being that the looms, or rather frames, are horizontal instead of upright. The memory of the workmen cannot possibly be assisted by seeing the pattern develop itself, as they always work with the reverse side of the web upwards. The kharkhanehs or workshops in which the weaving is carried on, are such low dark miserable rooms that one cannot but wonder that they should produce such beautiful manufactures. The shawls vary in price from 5 to 50 tomans (rs. 230), and fine carpets cost as much as from 4 to 10 tomans the square yard. Very few of the finer sort are made for sale in the bazars, almost all being made to order for grandees in all parts of the kingdom. As in the matter of Koork, the Wakil-ul-Mulk does a good deal of 'tidjaret' on the same principle in shawls and carpets. The spinning and dying of the wool for the carpets and the koork for the shawls are also carried on in Kerman, which thus produces the raw material and completes its manufacture.

"The external trade of Kerman is much less than that of Yezd. The chief exports are Koork (which is sent by Bunder Abbas and Kurrachee to Cashmere), wool, carpets, and shawls, cotton to Bombay, and grain to Yezd, which does not produce enough for the support of the inhabitants. The imports are chiefly cotton goods, sugar, copper, &c., from India. Once or twice a year caravans come from Seistan and Kandahar.

"There are few gardens near the town, but abundance of fruit is brought from Khubbes, a beluk or district 15 farsakhs (60 miles) to the north-east; wrongly marked on the maps as 15 days' journey.

"A mile or two to the east of the city is the ancient Gueber stronghold called Kalch Dokhter, or the maiden fort, built on a high rock. We were unable from want of time to visit it."

My fellow-traveller and I were to part company at Kirman; but the good old minister, to whom we thought best to trust our travelling arrangements, decided that we should proceed together yet further to the eastward, separating at Sabristan. The distance so traversed was about 100 miles, divided into five

stages. The first day took us to "*Mahún*," a populous village with many gardens, situated at the foot of hills. This place is famous for the shrine of a Mahomedan saint named Nyámut Ullah, whose prophecies were much talked of in India before the outbreak of the Mutiny.* Our second stage was "*Hánaka*," a dreary caravanserai amid snow-covered hills, a continuation of the Jufár range, running south-east of Kirman. The next stage, "*Ráyún*," was reached after a march of 26 miles; 16 of these over snow-hills, and 10 across a stony plain, in which, however, a decent road had been made by the Zábit of Rayun for some distance out of his village. This is a large, populous place, and has many fine trees, such as the sycamore and walnut. Heavy snow detained us for a day here, after which we moved on a long stage over a large, open, gravelly, and slightly undulating plain, between the never-ending hills, to "*Tah-rud*," literally the "bottom of the mountain stream." From Tah-rud we proceeded over rough, broken ground for a few miles, till we reached a fair road leading into "*Sabristan*," where was a caravanserai.

On the morning of the 21st January, Major Smith left me to make the best of his way to Bunder Abbas. I may here mention that he performed the journey within a fortnight, reckoning the distance at 270 miles. Deep snow, mountain torrents, and heavy rain, presented obstacles to his progress in a rugged and difficult country. He speaks in high terms of the kindness and courtesy of the Governor of Jiroft. This chief is a grandson of the old king Futteh Ali Shah, whose descendants are scattered in almost every part of Persia, filling offices of every description.

At Bunder Abbas Major Smith was joined by Mr. Vice-Consul Johnston from Bussora. They went in the steamer to Jashk, where they landed, and examined the coast up to Sooruf, a distance of 67½ miles—described as a "flat, uninteresting, and generally desert strip, varying in width from 1 to 15 miles, between a range of hills and the sea." At one place, however, a low sandstone spur of this range crosses the path, "which passes through a gap at an elevation of about 40 or 50 feet from the level of the plain." They also landed and conversed with the inhabitants at Tenk, an insignificant port between Sooruf and Choubar.

To revert now to my own route. But five or six stages remained, and I should be out of Persia Proper, and entering Beluchistan. My suite consisted of Hashim Bey, the attendant

* The tomb is of marble, and the room in which it is seen is well set off by a beautiful carpet, made at the manufactory of Ustad Hussein, whom we had visited at Kirman.

deputed by the Wazir of Kirman to escort me to Bam, two Persian servants, one of whom was the Pahlivan before mentioned, the muleteer, and a small boy who sat in a most elevated position on a well-packed white pony. A few extracts from my Diary will, perhaps, give the best account of the journey (see Tables at end of article).

In briefly reviewing the geographical results of the journey so imperfectly put before this Society, I would call attention to the useful work of Khanikoff, published some five years ago in Paris, under the title of 'Mémoire sur la Partie Méridionale de l'Asie Centrale.' The map attached to this volume is the true correction, though incomplete continuation of the Eastern Persia of English travellers in the commencement of the present century. My companion and I were ignorant of its existence as we journeyed along through Kirman; and Major Smith's remark on the position of the capital of that province entirely agrees with that of the Russian authority. We thought to find it nearly south, or at least south-east, of "Baghin," our eleventh stage from Yezd, and it was rather to the north of east. With the exception of Stanford's quite recent map of Asia, I know of none of our own, or the German maps, in which the same error is not found. The fact is, that the city of Kirman is very much more to the eastward, and less to the southward of Yezd than supposed, and the mistake has originated in the fact that the route from Kirman to Yezd, and that from Kirman to Shiraz, detailed in Kinnier's compilation, are one and the same for 40 miles, as shown by Major Smith, if not very much farther; the first running N.N.W., or N. and by W., the second almost due west.

M. Khanikoff gives Mr. Abbott credit for having, by his journey of 1840, corrected the great error of making Khubbes a central point in the road between Kirman and Herat, and placing it at a short distance of three days from the former town. We were told at Kirman that it was about 50 miles off, and recommended to visit it on our way to Bam, as being the centre of a flourishing district. Though Pottinger mentions that it is in latitude 32° 20′, his map shows it in 31° 45′; but it is rather in 30° 20′. In like manner Yezd and Kirman are out of their proper positions, singly and relatively; as will be seen on reference to Khanikoff. I allude to this particular circumstance, not because we do not owe much, nay, almost everything, to Pottinger, for what we have known of Eastern Persia and Beluchistan, but because his map has been usually accepted in all its detail, and much of it was filled in from hearsay and native reports. Below Kirman M. Khanikoff does not proceed; nor

did, I believe, Mr. Abbott, to whom he honourably refers, go eastward of Bam. In moving from Regan to Bampur, I had the advantage of passing along a track different from that marked in Pottinger's map; and again, in finding my way from Bampur to the sea, I had a like advantage in being, for the most part, on a hitherto unexplored path. The new names of places and lines of route to be added to information already acquired may not be of very general importance, but they can, at least, be vouched for as true; for I have seldom attempted to determine a locality not actually visited. For many reasons it is not easy to make minute surveys or take particular observations in these countries; but I would hope that, as we become more acquainted with them and their inhabitants, we shall be able to obtain for Mekran and the upper regions of Beluchistan all the attention they require in these respects. Thus would the telegraph be productive of results perhaps just as important to us as rapid communication with friends and fellow-labourers in the East: and in this light I think that all will admit that the land line has greater advantages than the sub-marine cable, even though the last pursue its marvellous course hundreds of miles away in the depths of the unexplored ocean.

REPORT OF A JOURNEY FROM SABRISTAN, S.E. OF KIRMAN, TO CHOUBAR, ON THE COAST OF BELUCHISTAN; VIÂ BAMPUR AND THE PASS OF FANOCH.

Date, 1866.	Stage for the Day.	Estimated Distance in Miles.	General Direction.	NARRATIVE; AND PARTICULARS OF ROUTE.
Jan. 21st	Darzin	18	E. by S.	Ground hard, gravelly, and tolerably level. Water abundant. Darzin was once a large town, and is celebrated as being the place where Firamorz, son of Rustum, was executed. It now consists of a modern caravanserai, erected within the last three years by the Wakil-ul-Mulk, minister of Kirman, and one or two other buildings on a smaller scale but much in the same style of architecture. A few widely-scattered ruins are all that remains of former days.
22nd, 23rd	Bam	17	E. by N.	Road good, over hard, gravelly plain, as yesterday; at first about E.S.E., then nearly E.N.E. About 13 miles, a large earthy-looking village of domes, on left, called Bahdirun; on right, a kind of caravanserai, known as "Haji Askir." The town of Bam, a name corrupted from "Bahman," its founder, is situated on a large and somewhat elevated plain between a range of snow-capped mountains at a considerable distance to the south, and low rocky hills a few miles off to the north. The old city, now the fort, is a mass of ruins, but the walls are in a good state of preservation, and the citadel, with its lofty white tower, is a picturesque and striking object. Pottinger observes that until the expulsion of the Afghans, this was held to be the frontier town of Persia on the south-east. His description is now sixty years old, and he speaks of the ruins as testifying to the existence of a much larger place. Since he wrote, it has been the scene of an international struggle, which, added to an earthquake, resulted in the almost utter destruction of the town within the walls. Nearly thirty years ago the Commander of the Shah's army besieged there, the well known Agha Khan Mehlati, then a rebellious Governor of Kirman. The fort was held for more than a year against the royal troops. The shot-marks in the walls prove that the matter was in earnest, but the capitulation appears to have been peaceably effected. It is now satisfactory to see that the more modern town, such as it is, can be built independently of fortifications. Estimating the houses to be about 2500, and the population 10,000, I should say that not one-twentieth part of the inhabitants live within the walls. Indeed, it seems to me that no residents are allowed there but the garrison and families, with a few vendors. Through the

				kindness of the Governor of Kirman, who gave me an order in his own handwriting to the Commandant, I was admitted to an inspection of the fort, a really interesting illustration of Oriental architecture. Pottinger mentions but one gate. That one is doubtless the same as that by which I entered, and leads by the main street and bazaar to the citadel. I am informed that there are two other means of ingress and egress, but saw one gate only. There is a large irregular ditch outside, in conformity with the quadrangle, of which the extent would perhaps be 500 yards for each face. The citadel appears to be partially built upon natural rock, and is provided with a well of drinking water. I learn that there are two companies of infantry and a few artillery kept in garrison here. My impression is that these companies cannot be reckoned at their full strength, and that there may be twenty gunners. The towers were alive with red coats, and about fifteen artillerymen were drawn out, under a Naib or Lieutenant, to carry swords as we passed towards the citadel; but what description of ordnance, if any, was under the large white cloth thrown over the two gun-carriages, I cannot determine. The men were generally well dressed and smart-looking for Persian soldiers. An instance of smartness may be cited in the direct refusal of a sentry to admit me to the fort without a written order. It so happened that we had walked away from my lodging, without bringing the essential document. The sentry placed his musket horizontally across the half of the gateway which he could so protect, and his comrades filled up the other half. On my expressing approval of the man's conduct, one of our party came up and assured me that the "Yawur," or Major commanding the fort, was one of the finest officers in Persia, insinuating that the proof of discipline just witnessed was the result of his efficient supervision. I paid a visit of ceremony to this functionary. He was an unmistakable invalid, and had hobbled out to meet me at the citadel. There is a good deal of cultivation, and there are many enclosed gardens at Bam; and provisions of kinds are abundant. So far as I could judge, the inhabitants are in no way behind those of other large Persian towns in intelligence. Many trade or travel on the Indian road, but mostly *viâ* Bunder Abbas. I was recognised here by a follower of Mahomed Bakir, late of Kurrachee.
24th	Allahabad Fort	20	E. by S.	Our course is amid many scattered ruins, over an open plain, hard and gravelly: occasionally salt ground with tamarisk-jungle. At 3 miles Burawur, a set of date-plantations and small villages on either side the road. Last 3 miles E.S.E. Passed Gurgund at about 10 miles to S.S.W., and 5 miles further, Kruk, to south. Range of small irregular hills on left, and prolonged higher range on far right. Allahabad is a kind of fort, with court and out-buildings full of poor

REPORT OF A JOURNEY FROM SABRISTAN, S.E. OF KIRMAN, TO CHOUBAR, &c.—*continued.*

Date, 1866.	Stage for the Day.	Estimated Distance in Miles.	General Direction.	NARRATIVE; AND PARTICULARS OF ROUTE.
				cultivators or tenders of cattle, of all ages and both sexes; cultivation sparse, but not wholly wanting; water abundant.
Jan. 25th	Nahimabad ..	16	E.	For the first mile and a half E.S.E., then turn up a broad nullah, over which looks the fort of Jemali, and proceed for 6 miles N.N.E. and N.E. to Azizabad, thence about 8½ miles to Nahimabad, E.S.E. and E. Arjuman is described as a village to the south-west. From Azizabad there is much jungle and cultivation. Pottinger's remark of "fine country, fertile and well cultivated," is applicable at the present time. There are very refreshing green wheat-fields, though in mere patches; and water is abundant. The Jemali nulla has a broad bed, thickly covered with high spear-grass. The hill of Basman forms a striking object in the distance, about E.S.E. Artillery horses kept at Azizabad, owing to plentiful forage. Country studded with forts and farms. Nahimabad is quite a populous village, but the space within the walls is insufficient. Much henna is here grown for export. Its small green leaf, pounded into a pale green powder, constitutes the well-known red dye used for staining fingers and nails. The berry is rubbed when dry in the palm of the hand, and throws out a fine seed, which is profusely scattered to produce crops. We have now fairly entered the "Garmsir," or hot climate, and the difference is very perceptible.
26th, 27th	Regan	26	7 miles E.S.E. 19 S.E. by E.	About 7 miles, Burj-i-Maàs, and date-trees near water, with a ruin on a hillock. Up to this point tamarisk and kohr jungle, though not so thick as yesterday. The last is evidently the "kunda" or thorn-tree of Sind. Afterwards descend to a vast open plain, hard and gravelly, with wild and widely-scattered vegetation. No water for about 9 miles, when soil becomes more sandy and prolific of wild products,* and the ground less level. Regan is quite a small village, and, owing to the low jungle, is imperceptible till approached closely. A Persian detachment of infantry and guns, under command of the Sirheng (Lieutenant-Colonel) Ali Murteza, son of the minister of Kirman, is encamped here, and I am met by the Yawur or Major of Infantry. On alighting and reaching the quarters assigned me, a messenger from the Sirheng proposes an interview; and it is agreed that I am to receive the first visit. The Sirheng

				comes accordingly, accompanied by Farjullah Khan, Governor of Bam, and Mirza Mehdi, an officer of engineers. In the evening I returned the call at the tent, and met there, among others, Ibrahim Khan, Chief of Bampur. The Sirheng has a jovial and good-humoured face, and frank, easy manners, reminding me at once of his father. The Chief of Bampur is a square-built, thick-set man, of perhaps fifty or sixty, whose well-dyed and silky beard renders doubtful an estimate of age. He talks a kind of Frontier Persian, which is to me rather difficult of comprehension. Having sent me a message, to the effect that I must return from Bampur to Bunder Abbas, if the Choubar route were found impracticable, I spoke to him on the subject. He told me that Shái Abdullah, Chief of Sirbaz and Kasrkund, in Mekran, had been lately murdered, and that his son, Din Mahomed, having proved rebellious, there had been bloodshed; but he could not now say what was the state of affairs, for he had been four months absent from his head-quarters. This Ibrahim Khan is the man who threatened interference with our Mekran land-line telegraph about three years ago, and is said to have himself come down with troops near to Gwádur, and killed there one Shahdada, Beluch, with others against whom he professed to have cause of complaint. His conduct occasioned a remonstrance to be addressed to the Persian Government through Her Majesty's minister, but the matter dropped after a short correspondence. I said if it were really contemplated that I were to go to Bunder Abbas, it would be better for me to go there at once, and abandon the visit to Bampur; but seeing that this notion was likely to meet with too ready approval, I changed my tone, and said I would go on as before intended, at all events, taking my chance as to further progress. The day after my arrival at Regan, the Persian camp moved. A man named Thamasp Kuli, employed by Ibrahim Khan of Bampur in a kind of frontier police, and who, in late years, distinguished himself in action against the Beluchis at the fort of Erfshan, is sent to escort me from this place on the morrow; for I am detained a day to procure camels and mules. It is decided that I am not to accompany the camp, as the Sirheng proceeds by the upper road, which it is not desirable I should follow, and has, moreover, some work which may detain him. I halt a day accordingly at Regan.
28th	Ab-i-garm ..	21	S.S.E. & S. by E.	After about 7 miles the jungle ceases, and road becomes stony. At 10 miles further enter the hills; another 4 miles bring us to the hot springs which give a name to this halting-place. They are indicated by clouds of smoke rising

* Among others, those known as "Ak" and "Bou" in Sind.

REPORT OF A JOURNEY FROM SABRISTAN, S.E. OF KIRMAN, TO CHOUBAR, &c.—*continued.*

Date, 1866.	Stage for the Day.	Estimated Distance in Miles.	General Direction.	NARRATIVE; AND PARTICULARS OF ROUTE.
				above the long grass with which the waters are choked. No village or house of any kind here, and but few traces of inhabitants. The rise is very slight on leaving the plain country. It is little more than becoming shut in by low, black, burnt-looking rocks, some sharp and angular, some like long walls with flat tops. Drinking-water procurable from hot springs. It is not tepid, but actually warm, almost hot, and when cooled is sweet and drinkable.
Jan. 29th	Saifu Din ..	21	S.S. by E. 10 E.S. E. & S.E. then E. by S.	Very stony for the most part, with occasional green and grassy plots, between low, black hills, some sharp and angular, some with long flat tops. The black rock is scattered about like coal broken up into small fragments. At 13 miles, "Chahi Kumber," where we were to have halted, but at my instance we moved on to a fine grassy plain with rain-water, and covered with flocks of sheep and goats. This is called Saifu Din; and the "Godur," or pass, of that name, opens out before us. Our object in pushing on is to avoid the rain, by which the mountain-torrents may come down in sufficient force to delay progress. Occasional ascents and descents in the day's march, but all are comparatively easy, notwithstanding the many loose stones. A few settlements of shepherds are about, but the want of population is undeniable. A Beluch guide told me that 150 soldiers had lately preceded us by this same route. They were on their way to Bampur.
30th	Giran Reg ..	22	S.S.E.	Road generally very stony. Follow the base of the hills in a north-easterly direction for a short distance, and turn south-east into the Pass. Ascent from plain not more than 700 feet, but steep enough to cause us to dismount. The black rocks are gloomy but picturesque. Here, regulated by the watershed, is the boundary of Narmashir, and commencement of the Bampur district. There is a fine view, on looking back, of the mountains south-west of Bam. The descent to the next plain is short and easy. Move across it in an amphitheatre of low hills for about 7 miles, and again reach rugged and stony ground. To S.S.W. are some curiously-shaped rocks, one especially, called "Mil-i-Ferhad,"

				Cross and recross the Giran Reg River, encamping finally on its eastern side, and E.S.E. of the hill known as "Takht-i-Nadir." Ground stony, but many patches of sand and gravel with tamarisk-jungle, wild oleander, and much desert vegetation. Water here and there in the bed of "Rudkhana," which is rather a mountain-torrent than a river. No sign of habitation.
	31st	Giran Bega ..	20	S.	At first follow the course of the Rudkhana over stony and difficult road, the track being sometimes quite lost. At 5 miles two streams meet it from E. or N.E., but we turn, or rather keep to the S.S.E. At 12 miles, after some rough marching, "Sir Naran," a halting-place, with fresh-looking streams falling over huge flat stones; water slightly brackish. At Giran Bega, see many shepherds and flocks. Encamp in a kind of rocky recess like the bed of a torrent, full of tamarisk and oleander.
	Feb. 1st	Luddi	27	S.S.E.	After 10 miles, passing "Chori Buzun" and black Iliat tents, reach the Rudkhana of Khosrin. Another 9 miles Rudkhana Zol or Sol, and single Bêr-tree. Another 8 miles the tamarisks of "Luddi." Road at first very stony, but improves at Khosrin, where we emerge from the hills into a more open country, and meet one or two small Kafilas. On leaving Khosrin, come upon a large, high, stony plain, which slopes gradually downwards, and improves as it becomes lower; vegetation being less sparse and more healthy. Luddi is in quite a forest of tamarisk and thorn trees, some of fair size and appearance. Wild caper also recognised. Had some trouble in finding rain-water, but a supply pointed out to us by a shepherd's boy. Flocks here numerous, and good grazing for camels. The day's encampment is cheering compared to the dreary and desolate hard, black hills left behind. The poor Beluch shepherds here, though rough outward specimens, seem civil and well disposed. Rain at night.
	2nd	Kalanzao	14	S.S.E.	To-day's encampment much like yesterday's, among tamarisk-trees and on sandy soil. There is no want of grazing for herds and flocks; and from what I can learn, rain is pretty regular here at this season. The Basman Hill seen from Regan to the eastward, now stands out N.E. by N. $\frac{1}{2}$ N. Its shape and snowy crest make it a picturesque object.

REPORT OF A JOURNEY FROM SABRISTAN, S.E. OF KIRMAN, TO CHOUBAR, &c.—*continued.*

Date, 1866.	Stage for the Day.	Estimated Distance in Miles.	General Direction.	NARRATIVE; AND PARTICULARS OF ROUTE.
Feb. 3rd	Chahi Shor .. Chahi Jellal.	22	E.	I mention both names, for the first appears in the German map of Handtke and Leo. There is now no well there, so we moved on about a mile further, and halted at one indicated by our guide. The water, however, was so putrid that we could not drink it. Better was shortly found in the vicinity. Jungle not so thick as before, and soil more sandy. No pools of rain-water visible, as at Luddi and Kalanzao.
4th, 5th	Kúch Girdan ..	25	E.S.E.	For 3 miles our course was observed to be E.N.E. We lost our path; and our guide, instead of seeking to regain it, started off to find an upper road, which we were to have reached at a later period in the day's march. This upper road is that taken by the troops, who are reported to have been yesterday at Kuch Girdan. We reach it after some 7 miles, and see distinctly the track of men and cattle. At 4 miles further a well; but we passed also two or three at intervals. Another 14 miles bring us to our halting-place among fine large tamarisks near a Rudkhana, which, if not the "Bampur" River of the map, is a branch of it. The detachment had left this morning and were to-day at Cassimabad, 9 miles from Bampur. Thamasp Kuli writes to Ibrahim Khan, announcing our arrival thus far. Some of our camels failed in coming up to-night. Roads heavy. The country is still the same vast plain between mountains. The ranges to the north are probably 150 miles distant from those to the south, and beyond the latter is Mekran, entered only at certain passes: all difficult. Observed to-day fine specimens of the "Kirrir," or wild caper. Compelled to halt on the 5th. Towards morning a damp mist rose with a high wind, which lasted the whole day. Our missing camels came up late, less one, reported to have died. Beluch cultivators here have been transplanted from Narmashir beyond the border. They are not a handsome race, have an African cast of feature, and talk semi-comprehensible Persian.
6th	Bampur	16	E. ½ N.	Crossing the Bampur nullah on the way, proceeded about 7 miles to Cassimabad, a Beluch village with farm fort, the inhabitants of which look wild and wretched. The poor habitations, the ill-clothed men, dirty and dishevelled women, half-naked children and general squalor and ugliness of this dark-com-

plexioned race, recall to mind the squaws and wigwams of other climes. My own horse having a sore back, I was glad to avail myself of a good riding-camel sent out for me by the Sirheng, who had just marched into Bampur. Halted for a few hours at Cassimabad in a neat and roomy hut, made of sun-dried bricks, mud, tamarisk-trees and like rude materials. Road sandy and heavy, through loose jungle.

According to the programme of my guide, who was in communication with Ibrahim Khan, I had to leave Cassimabad for Bampur at about three o'clock P.M. Shortly before reaching the latter place, I was met by the Naib Suliman Khan, Mohim Khan a chief residing near Minab, and several followers. Many Beluch horsemen joined in the retinue, and the Persian troopers performed clever skirmishing exercises. A horse had been sent me by the Sirheng to replace the camel ridden in the morning. To save time, and avoid the discussion so important to Persians as to who pays the first visit, I rode at once into the camp and alighted at Murteza Ali's tent. He received me very cordially, and we were soon joined by Ibrahim Khan and others. Matters did not, at first, look promising for my journey to the coast. The Sirheng was evidently inclined to do all I asked. He knew that his father had meant well to us, and had, at his father's written request, asked to see a letter addressed to me by the old Wazir since leaving Kirman. This letter was in reply to one of my own, in reference to statements made by a certain Mirza Mahomed Ali, whose veracity I had reason to doubt, and was couched in terms of marked friendliness. But the young Sirheng was only the nominal head in the present case. Ibrahim Khan was the man to decide on the propriety, or otherwise, of my journey through Mekran to the sea; and I knew that Ibrahim Khan had formerly shown himself openly hostile to British interests at Gwadur. Still there was something I did not dislike in the chief of Bampur. If a tyrant and a braggadocio, such a character was rather a development of the nation than individual; whereas plainness of speech and absence of compliment were characteristic of the man. And Ibrahim Khan was plain-spoken, and "unblest with set phrases." Suliman Khan had told me, as we rode in, that the country about Kasrkund was in a disturbed state. I had heard the same story at Regan, and elsewhere, and the account was now confirmed. It was clear that I was not to go the direct route, either by Gaih or Kasrkund, to Choubar. I suggested the road to the eastward, or to Sirbaz, in Persian Mekran, from whence I could proceed due south to Gwadur. Ibrahim Khan said he would send me there if I wished, but once across the Kej frontier, he could interfere no further. From all I could gather, he was not at feud with Faquir Mahomed of Kej, but he had no wish to enter into communication with him; nor could

REPORT OF A JOURNEY FROM SABRISTAN, S.E. OF KIRMAN, TO CHOUBAR, &c.—*continued.*

Date, 1866.	Stage for the Day.	Estimated Distance in Miles.	General Direction.	NARRATIVE; AND PARTICULARS OF ROUTE.
				their relations together be particularly intimate. It occurred to me that going over to Faquir Mahomed against the wish of the Persian authorities, or, rather, at my own independent suggestion, might offend, if it did not excite suspicion,—so I said plainly, that provided I got to the sea-coast of Mekran, the route was immaterial. Ibrahim Khan then offered to send me to Tenk, a little fishing-village west of Choubar, where I could get boats to Muscat, and on this understanding I left the tent. Shortly after, an old Persian came to me from the chief, and with him I compromised the matter, arranging that we should take the Tenk road from Bampur, but turn off to Choubar before reaching the sea. This suited my purpose in two ways:—1st. It enabled me to ascertain how far Persian control was exercised in the country bordering closely upon Gaih and Kasrkund, under Mir Abdullah, the Beluch Governor of Mekran; and, 2ndly, it led me through the Pass of Fanoch, hitherto unexplored by any European.
				The next morning Ibrahim Khan visited me in person. In the afternoon I returned his call, and then I was visited by the Sirheng, accompanied by the engineer Mirza Mehdi and others, and revisited by Ibrahim Khan. The latter was usually silent and reserved in the presence of the Sirheng, and not very communicative at his own quarters, but had much to say in his own rough manner, if applied to in the way of business.
				The town of Bampur, independently of its Persian garrison, may contain from 400 to 500 houses. With the exception of Ibrahim Khan's house, and one or two other buildings, these are little better than Beluch huts. The fort is a conspicuous object, built on a long irregular low mound. The higher or northern side boasts the citadel, from which the walls run down in an irregular line from north to south. There are soldiers and guns within; but the Sirheng's detachment is encamped on the plain outside. I am located in a fine large garden of recent construction, walled in, and rich with date-trees. It has also a few bêr-trees, and a specimen of the "sipastan." Provisions appear good and abundant, and water is procurable from the neighbouring nuilah. There is much cultivation about Bampur itself and at Cassimabad.
				The guide sent to me by Ibrahim Khan is an old man of about threescore years, known as "Meshidi Abbas." He has been in the habit of taking goods to and

				fro between Bampur and the sea, has often been to Western India, and is comparatively enlightened. By his own account, he holds the appointment of Collector of Fanoeh; and no doubt he is employed by the Bampur authorities in the collection of its revenue. Though I could have wished he had given me more reliable information on the names and status of the Belueh chiefs, and vilified the unfortunate Mekrans with less determination, I cannot but acknowledge his thorough loyalty to his own government and unflinching nationality. In spite of years, he is hardy and active, like most of his countrymen who earn their bread in the saddle.
Feb. 8th	Beluchan Chah	27	S.W.	After Cassimabad, to which place we returned before taking the road to the southward, the country to-day is liker a desert than any I have seen in these parts, yet no more meriting that designation than Sind, which it somewhat resembles. The sand-hills are, however, few and far between, and never succeed one another with the regularity of ocean waves, as between Rohri and Jesulmir. Halting-place beyond a range of these; but I could not find a trace of the well said to mark it. Ground here a little harder, and vegetation more generous than before.
9th	Muskotu	26	S.W. by W. $\frac{1}{2}$ W.	I am unable to find that any English or European traveller has ever preceded me in the route now followed. Esfaea, mentioned by Grant, is to the south of our position of yesterday. To-day we leave it to eastward, after proceeding some $2\frac{1}{2}$ miles south by east. At about 11 miles, came upon a village of Lashari Beluchis, near a well and low trees. We alighted in the immediate neighbourhood, and received a visit from them. Their curds, fresh butter, and dates were unexceptionable. At 5 miles further we came to some date-trees and a pool of water in high grass. Saw here a woman dyeing cloths. The dye is procured from the bark of the date-palm, mixed up with clay and water, and is almost black in colour. The sand-hills become less obstructive as we approach the Mekran Hills, and the road is tolerably good on harder ground. Muskotu is a poor village with few inhabitants, but has, doubtless, seen better days. It is situated near a date-grove on the south bank of a large, broad, and now dry Rudkhana. Besides the usual Beluch huts, it has its mud-fort, and, indeed, a second one in ruins. I am told that not many years ago these two forts, which are close together, were at war; and each assailed the other with stones. It is probable that the sequel to the story would tell of Persian interference, and the removal of the more dangerous of the combatants; for Ibrahim Khan certainly destroyed one of the two forts. Small-pox, and, more recently,

REPORT OF A JOURNEY FROM SABRISTAN, S.E. OF KIRMAN, TO CHOUBAR, &c.—*continued.*

Date, 1866.	Stage for the Day.	Estimated Distance in Miles.	General Direction.	NARRATIVE; AND PARTICULARS OF ROUTE.
				cholera, have contributed to the ruin of this village; but its position will probably prevent its total abandonment.
Feb. 10th	Fanoch	25	S.S.W. S.	Rain last night, but fine weather again to-day. Road hard and stony, or sandy and gravelly, intersected with many beds of streams and small ravines, and studded here and there with low black rocks or hillocks. About 7½ miles our road joins a second from Kalanzao, my stage of the 2nd instant, between which and Fanoch are three stages. At 18 miles a hillock, on which is a "Sungal," or square of low stone walls, thrown up for defensive purposes. My old Persian guide informed me that the grandfather of a Beluch horseman who accompanied us, had here successfully resisted a foray of Shai Mehrab, the Bampur chief of Pottinger's time; but that the poor man was afterwards killed in a similar affair elsewhere. A mile further, a large Rudkhana, called Kimini, with delicious water. This river rises here in the plains, after heavy rains, and winds into the pass of Fanoch; thence finding its way through Western Mekran to the sea at or near Kalig. Near Fanoch I observed on one side of our road some circular patches of light colour in the darker soil. These were explained to me as the "Pai Duldul-i-Ali" or footmarks of the horse of Ali. They may have been 3 or 4 feet in circumference, perhaps more. Fanoch is a comparatively large Beluch village in the plains north of the Mekran Hills, and close to a pass bearing the name which enters Mekran from the Persian district of Bampur. The fort is in ruins, and appears quite uninhabited. There are about 100 houses, and probably 500 inhabitants, nearly all of whom are slaves. A village called Ram, about 7 miles to westward, pays one-third of the revenue to the two-thirds of Fanoch, and the whole is received by a Persian collector. Chakur Nharui, grandson of Shai Mehrab, was, until lately, Naib of Fanoch; but he has been removed to the more important post of Sirbaz. His little son remains at Fanoch, and was brought to see me. He is a well-looking boy of about ten years, precocious in manner, and evidently tutored in complete subservience to Persia. I gave him a silk scarf, of which he seemed proud, and immediately tied it round his head in token of appreciation. The date-trees here are in great profusion, and there is cultivation to some extent.

11th	Benth	29	S.S.W. S. W.S.W. S.S.W. S. S. by W. ½ W.	Enter the Fanoch Pass into Mekran, and move for some distance through a barren defile, with nearly perpendicular rocks on either side. But the road, however stony and rugged, was not so much an obstacle to our camels as the water, which in some parts was very deep, and had collected in occasional scarcely fordable pits. Nor was it always practicable to avoid these. At 16 miles, defile, which had been improving, widens to open space, with view of distant hills; these narrow and widen again. 9 miles further Dehan, not visible from road, owing to trees. About 2 miles from Dehan is the Benth Hill, at foot of which is the village. We left it to the right, and alighted near some scattered trees beyond. My guide stated that Dehan had been quite depopulated by the late cholera visitation, there being some 15 houses only left out of 150. I would hope that this was an exaggeration. At Benth about 500 persons are reported to have died. I spoke to a fine old Beluch on the subject, and learned from him that the disease had ceased to rage for the last 5 months. There is a fort here, the chief of which is quite a young man, son of Ahmed Khan, deceased. The village is populous, but I have no good authority on which to suppose a number. There should be no less than 2000. Our course to-day was almost wholly along or beside the bed of the Fanoch River, which now changes its name to Benth. We met an unusual number of Beluch men and women, all engaged in locust-hunting. They had come down the river several miles from Fanoch, to take advantage of an incursion of these creatures, which my Persian designated as at once a calamity and a benefit. The Beluchis boil and salt them.
12th	Gonz	46	S.S.E. S.E.	A long march of 12 hours to-day; of which the first 6 were spent in following the course of the Benth River, which again changes its name to Korandab, and unites with the Nasferan. The second half was for the most part over a wild rugged country, amid hills such as I had seen daily in Eastern Mekran, and with few traces of habitation or life of any kind. It is no uncommon thing in this land to march 20 or 30 miles without meeting a human being or even a quadruped; and to this assertion I can testify from experience on either side of Gwadur. Passed to-day a block of white stone, which had been scooped out at the top like an apothecary's mortar. It is resorted to by the Mekranis, because the powder from the stone is considered an infallible remedy for toothache. Passed also the "Pir Ali,"* or a rock cleft in twain by the prophet's son-in-law. Legends of Ali abound throughout Mekran. The marks of his foot or the wonders of his sword are described in all parts of the country. Amid a

* "Tir Ali."

REPORT OF A JOURNEY FROM SABRISTAN, S.E. OF KIRMAN, TO CHOUBAR, &c.—*continued.*

Date, 1866,	Stage for the Day.	Estimated Distance in Miles.	General Direction.	NARRATIVE; AND PARTICULARS OF ROUTE.
				population of Sunni Beluchis, the fact savours of prior Persian occupation. Choose some tamarisk-bushes in sandy soil within reach of rain-water, where to spread our bedding. The name recorded applies generally to the neighbouring tract.
Feb. 13th	East of Tenk River.	28	S.E.E.	Start about 4 A.M., but before dawn lose our path in the rocky ground, and have to wait for sufficient light to resume marching. Fall in with a "Dowara," or moveable village of Beluchis at "Bir." They recognise my guide, flock round him, make him dismount, carry him off, and are apparently bent on entertaining him; but as we have a long march before us, I move on without awaiting his return. He soon reappears, attended by two Beluchis from the settlement. Descend into the bed of a mountain-torrent, and enter afterwards the broad bed of the Tenk River, remarkable for its high and steep banks. This we shortly abandon, and re-enter at a new point, then continuing to follow it for some miles. From the "Tenk" we strike off in an easterly direction across country. Long before midday, however, rain had set in, and up to nearly 3 in the afternoon we were working on under difficulties. Our intention had been to reach, if possible, the "Khor-i-kir," which it was feared would soon become impassable; but long before this obstacle was within easy distance, we were forced to dismount and bivouac for the night. The streams were coming down from the hills fast and furious in other quarters, and we were met by one which was sufficient to stop our progress. Rain till about 10 P.M., and shelter somewhat primitive. One of those many instances of popular superstition peculiar to the Beluchis was afforded in the march of to-day. We were passing the shrine of Shai, or Syud Harun, in the bed of the Tenk River, and two guides had accompanied us from Bir, to point out a by-path by which we could avoid a deep water-passage likely to detain us. Suddenly the guides stopped their camels and dismounted. One took in his hand a biscuit, turned to the right, and reverently placed his offering on the ground; the other advanced a few paces in the same direction, and made a solemn bow. Closely watching the quarter indicated by these movements, I saw a tree, which, though a tamarisk, looked almost Druidical, and quite picturesque; but Meshidi Abbas stated that the shrine was a well. He further informed me that no Beluch ever passes this

				place without laying there his offering, or would think of reclaiming any money or property accidentally dropped there; that if a traveller, halting there for the night, burns the wood and gives his cattle the fodder procurable on the spot, it is well with him; but if he should take the wood to burn elsewhere, it would be impossible to light it; or if he should cut and carry away the grass for consumption elsewhere, it would kill the animals which it was intended to nourish.
14th	Khor-i-Kir ..	5	E.	The 5 miles were not done, moreover, in one march, for we were informed before arrival at the Khor that it was not to be forded. Put up accordingly near a Beluch "dowara," and made a second move after mid-day. After reaching the bank of the Khor, we found the ground so soft and untenable, and the force of the current so strong, that we were obliged to abandon the attempt to cross to-day. This river comes down, it appears, from Gaih, whereas the "Tenk" is from a point to the westward of that town. But the latter has by far the finer bed; nor did I see anything like its steep banks at the Khor-i-Kir.
15th	Tiz Hill	43	S.E.	Crossed the Khor. At 18 miles, Khor Sangam, coming from the hill of Beshimun, which was forded with comparative ease. Passed on the way some Beluch tombs within walls, in good preservation; also patches of cultivation: 16 miles further the sand-hills of Pareg, where there are a few huts. Country difficult to traverse in parts, from water. Road at one time among low hills and rocky ground; at another, over alluvial or sandy soil, and amid low, scattered jungle. From Pareg to the top of Tiz Hill, between Tiz and Choubar, is about 9 miles, and thence only 3 remain to the latter place. We had seen the smoke of a steamer to seaward, and were desirous of completing our journey, but night had set in, and the path was lost. Bivouacked therefore for the night on the heights above Choubar.
15th	Choubar	3	S.	Descend the hill to Choubar, where I was received by the Wali and Ismael with much cordiality, and at once recognised as an old acquaintance. They accompanied us to the steamer, and we gave them a few trifling presents. Joined here by Major Smith, Lieutenant Stiffe, and Mr. Johnston, with whom I proceeded in the *Amberwitch* to Gwadur and Kurachi.
	Total miles	516		
	Add from Teheran to Sabristan	811		
	Total from Teheran ..	1327		

XV.—*Report of an Expedition made into Southern Laos and Cambodia in the early part of the year* 1866. By H. G. Kennedy, Student Interpreter at the British Consulate, Bangkok.

(Communicated by the Foreign Office.)

Mr. J. Thompson, a photographic artist, having arrived in this country, towards the close of last year, for the purpose of visiting the interior of Cambodia and taking views of the ruins which exist there, I availed myself of the permission which her Majesty's consul was good enough to extend to me, and accompanied that gentleman on what, to him at any rate, has been a most satisfactory expedition.

We left Bangkok on the 27th of January last, travelling by boat in an easterly direction towards the inland town of Prachim, distant about 88 miles or upwards from Bangkok. Our course for the first two days took us, as a reference to the accompanying map will show, through the Klong San Sëph, a long canal, cut to connect the Menam Chao Phya and Bang Phrăkong rivers. It runs through a wide-stretching plain, the major part of which is totally uncultivated, but is of considerable importance as the high road by which much produce from Korat and Southern Laos, from the eastern provinces of Siam and the upper districts of Cambodia, is conveyed to this city. A want of proper care on the part of the Siamese to widen and deepen this channel and to keep it clear of weeds renders the journey along it tediously slow, and only boats of a small carrying capacity, except in the rainy season, can make use of it.

A great number of Malays have for some time been settled along the banks of this canal. It is strange how they can permanently endure the attacks of the mosquitos there,—so terrible that the cattle and even the dogs pass the night in the water. No traveller, I believe, has ever spoken of this canal without some allusion to its mosquitos.

At nightfall, on the second day, we emerged from the above creek into the Bang Phrăkong River. There was very little cultivation to be seen on either bank of this broad and deep stream. Some attempts were formerly made to people the barren plains through which it flows by planting captive Cambodians there; but, though these settlements still exist, their occupants have as yet progressed but little in the cultivation of the possessions assigned to them. The town of Petrin, however, set a little above the mouth of the river, is worthy of notice, much sugar being manufactured from canes cultivated

Map of the GULF OF SIAM & adjacent Districts in LAOS & CAMBODIA

to illustrate the journey of

Mr. H. G. Kennedy

English Miles 20 40 60 80 100

Geographical Miles 20 40 60 80 100

Mr. Kennedy's route

SIAM

SOUTHERN LAOS

KINGDOM OF CAMBODIA

COCHINCHINA (FRENCH)

GULF OF SIAM

Dong Phya Fai Forest

Phā-kol-sai Forest

Khao Rinchi

Pulo Tantalam

Lower Country

Country covered with Forests

Thickly Wooded

Korat

Sureen

Pac

Patawi

Prabat

Sitha

Saraburi

Nokboori

Prom.

Saket

Bampo

Bankam

Angtong

Lake

Supanburi

Ban tan pra

Ban Kamen

Ta Maka

Wat Pak Bang

Sikut

Ayuthia

Bangchet

Bangchaipā

Pakret

Banlokhin

Banglao

Bang Pla

Non

Yakon Chasee

Chai Semeam

Potaram

Head of Tidal Influence

Chai Yah

Kenkadi

BANGKOK

Lak Krut

Rachaboori

Banchang

Umpewa

Sugar Loaf 1250 ft.

Banlam

Petchaburi

Menam Chao Phya R.

Tachin R.

Bang Pli

Paknam

Petrin

Bang-plam-Kong R.

Bang-khia R.

Anhun

Bang-pra

Lem-Kra-bang

Konap

Bansang

Prachim

Krabin

Nakhonajok

Gold Mines

Watsana

Aran

Sisuphōn or Tasawai

Sisuphōn R.

Nakhonburi

Klong Hau Kwai

Penamsôk ?

Dan Sema

Nakhon Wat ruins

Nakhon Siemrap (Angkor)

Battambong (Phra-tha-bong)

Banon

Lake Talé Sap or Tian Ho

Kampon Thom

Kampon Sawai

Campan-Tieu (Little Lake)

Potisat

Pintenang

Kampon Luon

Udong

Pinulai

PENOMPEIN

Dan lan Tuen

Bankoo ?

Trenan

Kepas-prec

Tien Giang

Hau Giang

Bah Phom

Anciang or Chaudoc

Canal

Kampot

Kankhao (Hatien)

Kankhao R.

Teksin Pk

Table Hd

R. Gia

Tammassou

Pulo Dama

Pulo Panjang

Pt Camao

R. Camao

Paps 100 ft.

Kampon-som R.

Tekliang or Elephant Mts

Samit

Koh Rong

Rong Sam Leni

Koh Tang

Koh Tron

Koh Kong 1500 ft.

Koh Kut

R. Mound

Koh Chang

1000 ft

Tung Yai R.

Fort

Chantaboon R.

Koh Kram

C. Liant

Rayong R.

Para R.

2977 ft.

6274 ft.

2470 ft.

1200 ft.

Sam-roi-yot or 300 Peaks 1900 ft.

Whæ Wan

Kow Luang 4326 ft.

Pathieu R.

Champon R.

Koh Gram

Chiya R.

Tow I.

Samui

Ligor

Bandon

Singora

Lamcolam Pook

Pakmun

Ubôn

Pimun

Si Saket

Se Mun

Se Si

Se Bay

Se Bo

Se Mun

Se Samlam

Se Cagmung

Muong Cao

P. Muong

Bassac

Copper Mines

B Cang huong Falls

Soronsai

P. Battiang

Bon Sung

Palese

R. Mekong

Khong

Sieng Pang

Khong Falls

Se Lompo or Tonly Ripu

Se Con or R. of 4 Hopeu

Sieng-Ireng

P. Som Coc

Sombor

Sambok

Cratieh

Contior

Cheu-tel-plo

Croc-tehmar

Pursued by the Journal of the Royal Geographical Society by J. Murray, Albemarle Street, London, 1867.

Edw.d Weller

by Chinese who are settled there. It is the residence also of a Roman Catholic priest, and contains a numerous community of native Christians.

The river higher up divides into two branches: that running northwards conducts to the town of Nakhonajok; while a second branch flows from an east-by-south direction through the districts of Krabin and Prachim.

Of Nakhonajok, I am told that it is a town of some extent, containing both Chinese settlers and natives of India. Sugar-canes are grown there, and the forests adjoining contain various kinds of woods, particularly that called Mai Tin sa-hin, so much prized by the Siamese for boat-building and other purposes. There is also a brisk trade in firewood, which is supplied thence to the sugar-mills at Petrin. A few silk sarongs are the only articles of manufacture, and the place is mainly important as one of the three outlets for the silk, ivory, and other produce brought from Korat and the northern districts of Laos.

Nakhonajok is reckoned to be one day's journey from Saraburi, one from Prachim, four from Korat, and three from Bangkok.

Following the eastern branch of the Bang Prăkong, we arrived, on the evening of January 29th, at the settlement of Prachim. This town is the capital of a province, or, as the Siamese term it, a Muang Luang: that is to say, that while itself under the immediate jurisdiction of Bangkok, it in turn owns authority over various smaller towns, each the head of an extensive district. In the present instance, Chantakham, Krabin, Watsana, and Aran are towns superintended by the Governor of Prachim. A great deal of rice is grown at this place, and some rosewood and timber of other kinds is cut: but the trade on the whole is inconsiderable. The neighbouring forests afford a shelter to numerous bands of robbers.

The authorities at Prachim, on seeing our passports, advised us to continue up-stream to Krabin, distant two days' journey by water and one by land; accordingly, we did so. The river became very tortuous, but the tedium of the journey was relieved by the extremely beautiful scenery which the lofty and richly-wooded banks presented.

We were now upwards of 100 miles from Bangkok, and the aspect of the country—no longer extending in swamps and dreary flats, with low mangrove jungles or a dark belt of coco-palms to bound the view—here, as throughout the rest of our journey, has a dusty white soil of fine sand. The cultivated districts, except in the rainy season, are dry, clear, and healthy, though the want of water is often severely felt. Coco-nut

trees being scarce, the want of oil is supplied by the general use of torches.

On the north these districts are bounded by a range of forest-clad hills, crossed by roads which conduct to Korat; while towards the south a vast plain stretches, with a scarcely perceptible slope, to the borders of the great Cambodian Lake. This plain is, for the most part, overgrown with forests, but the dryness of the soil stunts the growth of its trees; and many a flat, which the rains convert into a swamp, is so parched by the heats when the floods have subsided that nothing but jungle-grass will spring up there. Groups of low hills, thrown up apparently by igneous action, break here and there the continuity of this extensive plain.

We reached Krabin late in the evening, January 31st. This town is of some importance; many Chinamen and other traders resort to it for the purchase of produce, which is not only grown in the locality but brought here for sale from Korat, from Northern Laos, and from the upper provinces of Cambodia. The residence of the governor of the town proper is planted on an elevation some three miles distant from the river, which at this point breaks up into two inconsiderable streams and is no longer navigable. The market, however, and all the business of the place is conducted at the waterside, where I found a large number of cargo-boats, whose occupants, having disposed of the manufactures which they bring for sale, and having purchased such produce as they require, return to Bangkok as soon as the waters have risen high enough to allow them to start.

Krabin is a province of the Laos race, a people distinguished from the Siamese both in their dispositions and customs. Being far removed from the influences of civilization, their wants are few and their habits simple. Rice, fish, and fruits are the food they subsist on, and water forms their principal beverage. They spin for themselves the clothes which they wear, and they supply the lack of earthenware and iron vessels by the dexterity with which they construct utensils in wickerwork. It is only the leading men whom frequent intercourse with Bangkok has taught to covet greater luxuries. It must be added that these people are excessively idle, as might be expected in a country where the mere necessaries of life are so readily procured, while the task of clearing the land for extensive cultivation is exceedingly laborious, and offers but little remuneration.

Needles, thread, and other indispensable articles of foreign manufacture are introduced by the Chinese, who are planted in great numbers all over the country. Ponies are plentiful, but not commonly employed, buffaloes and oxen being the universal

beasts of burden. The soil being sandy, roads, except in the mountain and forest districts, are easily constructed. Goods are conveyed in carts drawn by buffaloes; but to Korat and some other distant towns access is so difficult, that all merchandise is transported in panniers on the backs of oxen. Long trains of these slow-footed beasts meet the traveller in the Korat forests. They appear but ill adapted for this use, being easily fatigued, and unable to endure thirst in districts where water is often extremely scarce; yet the people of the country have neither the energy to clear the difficulties which obstruct their mountain routes, nor the wit to substitute mules, or asses, for their own more clumsy beasts of burden.

Gold-mines were some few years back discovered in the immediate vicinity of Krabin. They are the exclusive property of the Chao Phya Umerat of Bangkok, who every year dispatches an officer to superintend the works, and collect the duty from those who resort there. The gold is obtained by washing. After the discovery of these mines one or two parties of Europeans proceeded thither from Bangkok; but the business is so trying, and the locality so fatal, that few of the adventurers lived to return, and the practice has consequently been discontinued. At present, owing to the death of his Excellency the late Umerat, the mines are closed. It is only in the dry season that they can be worked, and a duty of a fuang, for every fuang's weight of gold extracted, is collected from the miners—among whom Chinese, Siamese, Cambodians, and natives from all the neighbouring races, are to be found.

A cattle disease, which prevailed extensively throughout Laos and Cambodia during the previous year, not only carried off oxen, buffaloes, and ponies, but committed even worse ravages amongst the elephants.

At the small inland towns four or five only of these beasts are usually to be found; and, having been all in the present instance destroyed, we were compelled, not at Krabin only, but till our route brought us to the rivers of Cambodia, to travel with carts drawn by buffaloes, thankful if at occasional stages we were so fortunate as to procure ponies for our own riding. Buffalo-carts travel much more slowly than elephants; the cattle, on their part, require frequent rest; and the vehicles, being made only of wood and wickerwork, with not a nail or other piece of metal about them, are constantly breaking down and causing vexatious stoppages.

From Krabin a broad, level, sandy road extends right to Nakhon Siemrap, the modern capital of the province in which the ruins are situated; this road, the natives say, was constructed many years back by a celebrated Cochin Chinese

General; it passes at first through a wide forest of stunted trees, known as the Phā Kok Sai, and subsequently through barren flats. It was, however, *our* object—as the heats were every day becoming greater, as we had no elephants to help us on our journey, and as water and places of shelter were alike difficult to meet with—to push on with all speed till we should reach some spot on the streams flowing down to Cambodia where we could once more journey by water.

Tigers are said to abound along this route. I, however, saw none; though the jungle, for many yards on either side, is carefully cleared that travellers may see round about them and avoid a surprise.

There was little traffic to be seen; occasionally, only, we overtook a caravan of Chinese, conveying manufactures to the interior for sale.

In the afternoon of February 8th, we reached the settlement of Watsana, the chief town of the province of that name. We made a temporary halt at this place, having to send back the carts which conveyed us from Krabin, and to secure fresh ones. It is the custom of the Siamese to insert instructions in a traveller's passport, directing the authorities at the various places he may visit to assist in purchasing such provisions as he may require, and to hunt up and arrange for the hire of conveyances. No Governor is, however, bound to do more than see the travellers safely to the next town; the vehicles and guides are consequently subjected to continual changes, whence frequent delays arise; but some such plan is unavoidable in a country where, without the co-operation of the authorities, no foreigner could procure vehicles or even persuade people to sell to him the necessaries of life.

This province contains about 2000 inhabitants, of whom 70 or upwards are Buddhist priests. The prison is empty, either because crime is infrequent among so simple a people, or because the neighbouring forests afford a secure place of refuge to offenders.

Rice is almost the only produce cultivated.

Leaving Watsana on February 10th, we halted at Aran on the morning of the 11th. This town occupies the centre of a wide stretch of paddy-fields, and is the head of a province containing about 1600 inhabitants.

Having passed the watershed, we now found a small stream running to the south-east; but the waters are, at this season, too shallow to admit even the canoes of the natives.

We left this settlement on the 12th of February, and soon after, emerging from the forest, pursued our journey for three days continuously through a dry sandy plain, overgrown with a

thin crop of parched jungle-grass, and, at rare intervals, diversified by a clump of stunted trees. The heats along this barren tract were excessive; while the stagnant pools of water, polluted by every passing drove of cattle, were unfit even to bathe in. Swarms of flies gave us unceasing annoyance. I was informed that in the rainy season this prairie is entirely submerged, so that light boats can travel over its surface.

On the 15th of February we reached Sisuphōn, a town planted on the high banks of a practicable river. This place is the capital of a Cambodian province, containing upwards of 1500 inhabitants, of whom about 60 are priests. It is three days distant from Korat, and is under the immediate jurisdiction of Bangkok. The famine which last year prevailed in Korat, driving the inhabitants to the border towns in search of subsistence, made its presence severely felt in this locality also. Even now, when the scarcity had long subsided, fowls, the commonest of live stock, were not to be procured; as all the poultry had been eaten up during the season of scarceness. In the immediate vicinity of this town rises a clump of three low hills, thrown up, it may be, by igneous action, and covered with an incredible number of curious fossils, shells, fishes, and coral.

Little can be said respecting the trade of this town, whose inhabitants desire nothing more than to raise rice, cotton, tobacco, silk, and such like produce, in quantities sufficient for their own consumption. Its river, like all other streams in Cambodia, swarms with an incredible multitude of fish; the villagers net them day by day, and swarms of aquatic birds unceasingly pursue them, but their numbers never diminish.

On the 17th of February, after a three hours' journey, we reached the town of Nakhonburi, the head of a small province of about 800 inhabitants, and under the authority of the Governor of Phra-tha-bong. Here, having procured two small boats, we once more took to the water, and, on the evening of February 18th, started down a shallow stream, running in a south-easterly direction, between high and darkly-wooded banks. For the next three days our journey was very monotonous; the river, little frequented by foreigners, but to the natives known as the Klong Hua Kwai, makes its way apparently through wide and desolate forests; and the only inhabited places we came upon were the stations temporarily established by families of Cambodian fishermen. I must be permitted, however, to observe that to a naturalist this stream must present a field of singular interest, from the number, size, and variety of aquatic birds which throng the stillness of its lonely banks.

On the morning of the 21st of February we came upon the scanty and shattered relics of an ancient Buddhist temple;

these were similar in style to the ruins which we visited subsequently in other parts of Cambodia; but the thickness of the surrounding forest rendered it impossible to form an idea respecting their original size.

Leaving this place, we emerged about mid-day into the broad river formed by the junction of this stream with that flowing from Phra-tha-bong, and at 7 P.M. on the same day halted at Dan Sema, one of the frontier custom-houses of the Phra-tha-bong Province, where duties are collected from all the trading vessels that frequent the waters.

The city of Phra-tha-bong is a day's journey from this point. We did not visit it ourselves, but I ascertained that it is a town of much importance, having many rich products, and a comparatively extended trade. A Roman Catholic priest, and at least one French trader, are already settled there, and the Governor is said by the French to be a man of considerable ability. Phra-tha-bong pays an annual tribute to Bangkok of 70 piculs of cardamums, which may be reckoned in money value to be about 11,200 ticals.

It has been said by a late writer that this town was founded at a very recent epoch, and by the orders of the King of Siam. This statement, so far as I know, is correct; but there are nevertheless ruins in the vicinity of the town of an era corresponding to those in other districts of Cambodia. From Dan Sema we were forwarded without delay in a commodious twelve-oared Cochin-Chinese boat. The river, broad and stately as the Menam Chau Phya below Bangkok, is enlivened by no inconsiderable traffic; its waters, now swelled by a confluent, now broken by a picturesque island, discharge about fifty miles below Dan Sema, into the head of the great lake. By 7 P.M. on the evening of the 22nd we could hear the winds roaring over this vast sheet of water, and in the calm of the succeeding morning we travelled about thirty miles over it in a nearly easterly direction, till we entered a small creek which conducted to Nakhon Siemrap, the modern capital of the province in which the celebrated ruins are situated. We reached this place on elephants on the following day, and thus brought our travels for the present to a close.

Nakhon Siemrap is one of the two Cambodian provinces which still form dependencies of Siam.* It was in former times the centre of the Cambodian empire, and must have contained a dense population; but at present the inhabitants scarcely exceed

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* There are one or two smaller districts, *i.e.*, Sisuphon, Nakhonburi, &c., which are called Cambodian, but they are on the confines of Laos, and partake quite as much of the one race as of the other.

ten thousand, a number singularly disproportionate to the size of the province. It embraces an area of more than 900 square miles (I myself travelled upwards of 30 miles across it without reaching the frontier), and in the vicinity of its capital is under an advanced state of cultivation. The major portion, however, of its territory is now covered with forests, broken only by the clearings round a few scattered villages, whose inhabitants grow rice enough for their own consumption, and produce palm-sugar in supplies sufficient for a considerable exportation. On the north this province is bounded by the Laos district of Sureen; on the west its frontiers stretch to those of Penamsôk and Phra-tha-bong; it is conterminous on the south with the kingdom of Cambodia; while the mountain ranges, which shut in its eastern borders, extend in no strictly defined limits to the banks of the Mekong, and the upper districts of Cochin-China. Nakhon Siemrap pays an annual tribute to Bangkok of ten piculs of beeswax and fifty of bastard cardamums; estimating the former at 50 ticals a picul, and the latter at 20, the value of the whole will be found to be 1500 ticals. This produce is yearly delivered in Bangkok to His Excellency the Phu Sara Pai, who presents half of it to the King. The capital itself consists of a walled town, half a mile square, placed on the banks of a small stream about 15 miles above the shores of the lake. The Governor, of course, resides within the walls; but by far the greater portion of the inhabitants have settled about the banks of the stream outside, finding it more convenient to be in proximity to the water. The Chinamen, who are found in some numbers amongst the population, have established a small market in the principal part of the town.

There being an abundant supply of Mai Takienne and of other timbers suitable for boat-building, many of the inhabitants are engaged in that employment. The vessels built carry from 50 to 100 piculs, and their prices range from 150 to 170 ticals; they are in general esteem throughout the country, and are bought up both by the fishermen and by numbers of those who traffic about the Cambodian waters. In Bangkok, a boat of the same description would be worth about 500 ticals. It is to be regretted that the want of good water-communication offers a serious bar to those who might wish to engage extensively in cutting the timber of the forests. Many excellent varieties of wood are to be found there, and two, bearing the native names of Mai Chun-chat and Mai Katrao, are especially deserving of mention. These were the woods employed to construct the ceilings and other portions of woodwork required in the interior of the temple of Nakhon Wat. Fragments of the richly-carved beams are here and there remaining, and by their soundness

testify to the durability of a wood, which, for 1600 years, it may be, has thus resisted decay.

The province generally seems to be well adapted for raising rice, tobacco, cotton, and silk. Coco-nut palms thrive in the soil, and the castor-oil plant grows wild about the country. The neat homesteads, in the vicinity of the capital, are surrounded each by its stock of sugar and areca palms, mingled with coco-nut trees and rows of plaintains; while the goodly supply of buffaloes and oxen, stabled close at hand, give further testimony to the superior affluence even of the peasant classes. When we consider how large a profit they bring back from the fisheries, on returning at the end of each season to the cultivation of their rice-fields, I think the opulence of this people is satisfactorily accounted for.

I surmised at first, from the thriving aspect of the province, that its Governor possessed more discretion and less rapacity than is common amongst Siamese rulers. Subsequent enquiries, however, convinced me to the contrary, showing that the Governor, while as grasping as the rest of his class, was singularly unfitted for conducting the administration of a frontier province under the eyes of a neighbour so adventurous and aspiring. He is personally civil and obliging, but his faculties are impaired by advancing years; and he is much disturbed at seeing that each year brings foreigners in increasing numbers to visit the ruins of the province.

There are fifteen criminals in the prison, the major part of whom are under a life sentence for theft; but there were also three murderers just captured for a deed perpetrated four years ago, and waiting till the customary reference should have been made to the King, in whom alone is vested the authority to determine their execution. Debtors are made over to their creditors to work out their debt: they are seldom put in irons, unless they have attempted to run away, and are generally treated with lenience.

Numerous temples of modern construction surround the city of Siemrap; but they lack the solidity which marks the earlier structures, and are already in an advanced stage of decay. There can be little doubt that this place was formerly one of the great centres of the Buddhist worship, and the number of priests to whom, even at the present day, it affords a maintenance, is strangely disproportionate to the extent of the population.

On the 26th of February we quitted Siemrap, and, after a ride of 4½ miles through a sandy jungle-track, emerged suddenly from the forests upon the front of the temple of Nakhon Wat, the most famous and best preserved of the Cambodian ruins. I abstain from introducing here any lengthy description of the

remains we visited; the particulars of which are already known, as I believe, to archæologists; but I trust, on a future occasion, to append a short chapter to the present report, containing such details of what the great Cambodian empire has bequeathed to its descendants as may seem to me to have not yet been brought fully under the notice of those interested in the matter.

Our quarters during the chief part of our stay in the locality were in one of the numerous salahs, erected from time to time by merit-working visitors in the spacious enclosure which surrounds the great temple before mentioned, which the care of the architect who designed the whole has furnished with more than one reservoir of excellent water. About thirty or forty priests have fixed their habitations under the shelter of the ruins, and find a never-failing employment in conducting the obsequies of those whose bodies are brought to this highly-venerated sanctuary for cremation; and when to the music and feasting, which forms part of such ceremonies, we add the constant influx of visitors who come to make offerings at the shrine, it will be seen that it was not in forest loneliness, but rather amid a busy scene of life, that we were established.

On the second day of our stay at this place we were visited by two French traders, who had come into these districts with the view of embarking in the fish-trade. They complained greatly of the present state of trade in Saigon, where, they said, the Chinamen were engrossing all the business: they added also that any one wishing to occupy a piece of ground in that city was compelled to deposit a heavy sum of money in advance, which they said was a great discouragement to small capitalists. These observations respecting the commerce of Saigon were confirmed to me on several subsequent occasions. While merchants from Europe reap but slender profits, Chinamen are able, in three or four years, to amass ample fortunes; indeed I was told, on excellent authority, that the residences of Chinese traders at Saigon already exceed in their magnificence any that are to be found at Singapore.

On the 4th of March, and while we were still quartered on the premises of Nakhon Wat, Captain de Lagree, Commander-in-Chief of the French forces in Cambodia, arrived on a visit to the ruins. He brought three French sailors and a draughtsman among his train, and took up his residence on the same ground as ourselves. I ascertained afterwards that this was the second time that Captain de Lagree had been in the neighbourhood.

During his present stay here he paid frequent visits to the ruins in the old city, but was chiefly employed in drawing up an accurate plan of the great temple and in taking plaster-casts of certain portions of the bas-reliefs. I discovered from con-

versation that he was intimately acquainted with the topography of the country, and with the ruins that are scattered everywhere over the districts which composed the ancient kingdom of Cambodia.

He was careful to explain to me that the original limits of that empire extended to the northern frontiers of Korat; and I found that he was furnished with large and accurate maps of Cambodia and Cochin China, recently compiled from surveys of these countries made by officers of the French Government. These maps have been published in Paris, and I subjoin a memorandum to this paper containing information as to where they may be procured.

Captain de Lagree quitted these districts about the same time as ourselves, and taking the overland route down the eastern shore of the Great Lake to the city of Kampon Sawai, he passed thence to where his gunboat was awaiting him in the river which runs from the outlet of the lake to Penompein.

On the 10th of March, and while ourselves and Captain de Lagree were still staying at Nakhon Wat, there arrived a Siamese nobleman, despatched by the King, as he informed me, on a special commission to explore the ruins and take drawings of the bas reliefs. He brought with him draughtsmen and other requisites for that purpose, and he delivered to us a message from his Majesty, enjoining Mr. Thompson to take elaborate and complete photographs of all that was interesting. These he gave out as the sole objects of his mission; but M. Lagree afterwards told me that he came charged with a secret political purpose, the nature of which I did not ascertain.

On the 11th of March we shifted our quarters and removed to the old city, which stands about a mile distant from the great temple, and encloses six square miles of ground within its lofty and solid walls.

This area is wholly overgrown with jungle and forest-trees, and is so thick with ruins of temples, palaces, and other buildings, that it would require at least two months to explore it satisfactorily. Deer and even tigers roam unmolested over the deserted city, whose only inhabitants are a few families of slaves, sent there by their masters to collect oil, ratans, beeswax, and other produce of the forests. Here, as at Nakhon Wat, numerous and extensive reservoirs, lined with walls of solid masonry, secure an abundant and never-failing supply of water. But the neighbourhood is unhealthy, and on the third day we were forced to fly from the fevers which had broken out amongst our party.

The preparation of a boat wherein to continue our journey being likely to detain us some days at Siemrap, we employed our leisure in a three days' excursion to the neighbouring mountains,

whence the stone used in the buildings we had visited was reported to have been procured. We found that the high ground about the foot of this range was covered with enormous boulders of the stone, which cropped up from the soil in every direction; but we were unable to penetrate the dense forests enveloping the hills themselves, and which are said to conceal, not only the chisel-marked quarries where the stone was cut, but also an immense image of Buddha, hewn from the solid rocks in the farthest recesses of the jungle.

On the 21st of March we were able to take a final leave of the neighbourhood of Siemrap, starting at daybreak, in a ten-oared boat, and travelling down the lake in the direction of Udong.

This great lake, which forms the most striking geographical feature of Cambodia, is upwards of 100 miles in length; and though its breadth is small when compared with its length, yet it is only at its extremities that the eye can see across it. It is bounded sometimes by a broad belt of forest, sometimes by low swampy lands, and in the dry season is so extraordinarily shallow as to be scarcely breast deep, even three miles from the shore. In the rainy season, however, there is a very considerable rise; the lake then spreads its waters far into the forests which gird it, and becomes navigable for steamers of considerable size. The bottom consists of mud and sand; and the currents, which are reported to be strong in the time of flood, become insignificant when the waters have subsided. Frequent and strong winds blow with regular alternations, according to the season of the year, and render both the lake itself and the banks round about it cool and healthy, even during the greatest heats.

Numerous families of Cambodians, Cochin-Chinese, and Annamites settle every dry season along the shores of this lake, and employ themselves in taking and curing the fish with which its waters are incredibly thronged. During the first three months, two sorts only of these fish are taken; during the last, they pursue a monstrous black species, not uncommonly twenty feet long. The latter is very plentiful, and not only forms an article of food, but supplies the oil in general use among the common people of Cambodia. Two or three families, to the number of twenty souls in all, will commonly associate together for a season's fishing. The nets, which are large, and perhaps worth some seventy ticals (10*l.* 6*s.* 5½*d.*) a set, they prepare anew by their joint efforts during the leisure of each rainy season.

The salt they purchase for about half a tical a picul at Penompein; and they are provided with two or three fine cargo-

boats, built for the purpose of Mai Takienne, and carrying from 70 to 100 piculs a piece. On the spot which they may each year select for their purpose, they build temporary residences with bamboo and ratans, at little outlay, either of labour or capital. In the course of three months, a party of fishermen will thus cure about 400 piculs of fish, entailing a consumption of 120 piculs of salt; and they will dispose of the whole at Penompein at the rate of about five ticals a picul. It will thus be seen that the business is far from unprofitable; indeed, several French traders are already engaged in it, and it is anticipated, as M. de Lagree has stated to the King of Cambodia, that next year will see no inconsiderable number of his countrymen established about the shores of the great lake. Having concluded this enterprise, and disposed of their stock, the fishermen leave their settlements to be swallowed up at the rising of the waters, and return to their homes in time for the cultivation of their rice-fields.

In many of the shallowest parts of the lake the water sinks so low that, during the last month of the dry season, a crop of paddy is grown in the rich muddy bottom, which a little later will be covered with several fathoms of water.

Early on the 24th of March we passed through the straits which terminate the larger lake, and emerged thence into a smaller one; having crossed this by about 3 P.M. on the same day, we entered the broad river which forms the outlet of these waters, and which, after running past Kampon Luon, and thence to Penompein, unites at this last place with the Mekong, the mightiest of the Cambodian rivers. The banks on either side of our course now became sandy and high, but the houses, though planted on their summits, were still carefully raised on piles some distance above the ground, to escape inundation when the floods set in. The principal occupation of the inhabitants of the frequent villages which we passed was the preparation of indigo-dye, and the manufacture of fish-oil. Both were very conspicuous employments; as, in the one case, the large pitchers of blue dye were set out to the sun in rows along the terraced banks, and in the other, the furnaces for preparing the oil were scooped out of the soil along the edge of the river.

Tigers are so numerous throughout these districts, that even in the largest settlements the inhabitants are afraid to linger about the outskirts of their dwellings so soon as darkness has set in.

At sunset on March 24th we came to where M. de Lagree's gunboat was awaiting his arrival, and as that gentleman had politely sent notice of our approach, we were received with the greatest kindness on board. This vessel is a small iron-clad

screw-steamer, carrying a crew of 35 sailors, and a single heavy rifled cannon in the bows. The French Government have placed her permanently in these waters; but the medical officer resides at Kampon Luon, where M. de Lagree also has a house, and his Government a military depôt. We reached this last place at daybreak on March 26th, and found it to be of some importance, and the seat of a considerable trade.

A market runs nearly the whole length of the town, which is formed of a double row of houses stretching upwards of a mile along the right bank of the river, and of a multitudinous fleet of boats, moored along the shore, and laden with produce from every corner of the country. A fine paved causeway is carried through the town, at right angles to the central part of which a broad smooth road conducts, with a gentle rise, to the city of Udong, lying on a slight eminence $4\frac{1}{2}$ miles distant from the edge of the river. The trade is similar to that of Penompein, particulars of which may be found in the table to my original report. Numbers of Malays have, for several centuries, been settled in this locality; and many other races are represented amongst its population. All the respectable inhabitants are clad in the bright-coloured silk fabrics which are extensively manufactured here; and as they hurried to and fro, sometimes on ponies, occasionally on elephants, but more frequently in light carts drawn by fleet Cambodian cows, they presented a busy and brilliant scene of life, such as we had not hitherto encountered. If these people are dirtier in their persons than the Siamese, they certainly surpass them in municipal cleanliness. Their roads are bright, and in good order; their markets are everywhere free from the offal which pollutes the bazaars of Siam; the King's steamer and his palace are patterns of neatness; while their temples neither inside nor outside exhibit a trace of the slovenly neglect which defiles even the most sacred and sumptuous of the shrines about Bangkok.

A small French steamer plies once a month between Kampon Luon and Saigon, starting from this last city on the arrival of the mail by the Messageries from Europe, and reaching her destination three days afterwards. The King of Cambodia, shortly after his accession, procured a coining-press from Europe and commenced to issue a silver currency, modelled after that prevailing among the Siamese. Finding, however, that his coin drifts steadily into the hands of the Chinese traders, by whom it is exported to China, he has thought fit to close the mint, and to allow the old Cochin-Chinese currency to come once more into circulation; this consists of three singular pieces of coin, manufactured at Huè, by Thu-duc, the Emperor of Cochin-China. The commonest is made of a brittle composition, whereof

the chief ingredient is antimony. Each coin is a little bigger than a farthing, and is bored with a hole in the centre, so as to allow numbers to be run together on a string; 2400 of these little coins make up the value of one Siamese tical (about 2*s.* 8*d.* sterling). They are universally in use among the people of Cambodia, who may be seen carrying them in cumbrous bundles from place to place. In Bangkok the same coins are employed as counters at the public gaming-tables. In a country where so much false coin is in circulation, and where the adulteration of money is commonly practised, it is yet hardly worth the while of any to tamper with pieces of such insignificant value, so that there is, at any rate, one advantage which they possess. Besides the above coin there is stamped bar-silver, each bar being worth 30 Siamese ticals; and lastly there is stamped bar-gold, each bar representing 187½ ticals of Siamese currency. This last coin is scarce, as may be supposed; but it is an exceedingly handsome piece of money.

We found at Kampon Luon that his Majesty the King of Cambodia was at present residing at Penompein; and that his uncle the Somdetch Chao Fa Thon La-har was left in charge of the capital. We determined to visit this gentleman, and accordingly left for Udong on ponies during the afternoon of March 26th. Half-an-hour's ride brought us to the gates of the city, which, having been built by the late King while Cambodia was the theatre of constant disturbances, has never attained anything but the most insignificant proportions. The walls consist simply of a double row of hoarding, 10 feet high, and inclosing in a space of about a square half-mile the palaces and premises attached thereto, the residence of his Majesty's uncle, and those of one or two other of the principal personages, together with a good-sized market and four reservoirs or sheets of water. The noblemen, the courtiers, and all the rest of the inhabitants reside either at Kampon Luon or in hamlets scattered over the country outside. There is not even a temple within the walls of the city, which, during the absence of the Court, is almost entirely deserted; and whence the bazaar also has migrated with his Majesty to Penompein. Even the palace consists of a few thatched wooden residences, scrupulously clean, but wholly unworthy to be the dwelling-place of a monarch. Finding so little of interest in this place, we returned in about an hour to Kampon Luon, where we were hospitably received by Dr. Hennuart, the French surgeon attached to that station.

On the morning of March 27th we quitted Kampon Luon, and continued our course down the river to Penompein, which we reached at ten o'clock on the evening of the same day. This is the most important town in Cambodia. His Majesty the King

has lately taken up his residence there, and has employed a French architect to build him a large and substantial palace, which is now in process of construction near the bank of the river.

A reference to the accompanying map will show that this settlement commands the junction of four rivers; that which runs from the Great Lake, and which forms the high road for the traffic of Upper and Central Cambodia, here uniting its waters with the main branch of the Mekong; the confluents, dividing where they meet, thence send two branches southwards in the direction of Saigon, and the outlets in Lower Cochin-China. It will thus be seen that the King of Cambodia has been wise in selecting as his new capital a town whose site is of such great commercial importance; and which has, in fact, long been the seat of a thriving trade, conducted with all the surrounding countries. It enjoys also further advantages: planted in a dry and sandy soil, on the lofty banks of the adjacent rivers, it is fanned day and night by frequent breezes, now blowing from the seaboard, now from the cool surface of the neighbouring waters. I was there during the hottest season of the year, but found the climate more salubrious and refreshing than that of Bangkok, or the other inland settlements in Siam. A great change, however, must take place in the aspect of Penompein during the period of the inundations; the waters rising from 32 to 33 feet above their accustomed channel submerge the lofty banks, and flood such dwellings as are not elevated on piles beyond the reach of danger.

The presence of the Cambodian Court, which has lately fixed its residence at Penompein, is working a great and rapid transformation in the condition of the town. A broad and solid causeway, stretching through the principal quarter, will shortly supplant the original narrow thoroughfare; a handsome and substantial palace is in course of construction; and while the Mandarins are fast filling the eligible sites with private residences, the booths in the market are giving place to commodious brick dwellings which traders are erecting there.

The French Government has a small military and naval depôt at Penompein, and a postal agent resides there. Catholic priests are established in three separate missions, under the superintendence of the Bishop, Monseigneur Miche, who has charge of the interests of his Church in Cambodia. There are also a few French *employés* in his Majesty's service, and one or two merchants; but the inviting prospects of the settlement have hardly as yet so grown into notice as to attract thither any great number of foreigners.

The native population must constantly fluctuate, but com-

prises native Cambodians, Cochin-Chinese, Chinese, and Annamites, besides sundry emigrants from Siam and her tributaries. One of the chief elements of the population is derived from the Malays introduced into the country some centuries back, and whose descendants are found settled in great numbers at Udong, Kampot, and other parts of Cambodia.

These Malay tribes still speak a corrupt dialect of their parent language, and retain many of the habits and manners of their forefathers; they are subject to the King of Cambodia, but have chiefs of their own stock, to whom the general control of their affairs is entrusted. But while thus preserving many of the distinctive features of their race, they have lost the courage and energy, the skill in navigation, and the superiority of intelligence for which the tribes of Malaysia are celebrated.

The Cochin-Chinese engage very actively in the fish-trade, and numbers of them are converts to the Roman Catholic religion; they are great gamblers, and own most of the tables which are set up nightly all over the bazaars: indeed, so far as I could judge, and considering the disparity in population, there is much more gambling carried on in Cambodia than there is at Bangkok.

The Court and Government of the Kingdom of Cambodia differ little from that established in Siam; both indeed, from what I ascertained by inquiry, or gathered from personal observations amongst the ruins, being modelled from that which formerly existed in the ancient Cambodian empire.

The Court of Udong is inferior both in numbers and sumptuousness to that of Bangkok. The Senabodi consists of four members, as contrasted with the six which compose the Siamese Council; but there, as in Bangkok, two officers of the highest rank divide the duties of the administration: and the principal gathering of the Court is held with closed doors at midnight in the interior of the Palace. There is at present no second king, and I took occasion to ask his Majesty whether it had, at any time, been the practice in Cambodia to divide the honours of royalty. He replied that such had frequently been done; and that, if his brother at Saigon were to come into the country, and there were a general wish for his elevation to the throne, it would be his duty to sanction the measure.

I was told by a Frenchman in his Majesty's service that the King's income may be reckoned at about 1000*l.* a month; but though M. Le Foucheur had ample opportunities for framing an estimate on the subject, I yet conjecture that he may have been anxious, so far as possible, to give me unfavourable impressions respecting the general affluence of the country. His Majesty, too, has many private sources of wealth, which it would

be impossible to ascertain precisely; but it must, after all, be admitted that neither the King nor his courtiers can at all rival the opulence of the authorities at Bangkok. But, if they yield to their neighbours in the extent of their revenues, they at any rate eclipse them in the politeness of their manners.

The French have already taught them to treat foreigners with a deference and respect, which is often found wanting in Siamese officials; they have imbued them with a taste for European habits and refinements; and, by raising a desire for the luxuries enjoyed in civilised countries, they have inspired them with a conspicuous anxiety to increase their revenues by the development of the produce and commerce of their country.

The treatment which I received during my visit to Penompein, at the hands of the King himself, and of the mandarins about his court, left nothing to be desired; and, though prompted so to act doubtless by a natural anxiety to cultivate the friendship of the English, yet the manner in which they carried out their intentions showed how rapidly French tuition is advancing them in civilisation.

On placing my letters of introduction in the hands of the proper authorities, I had not long to wait before the King's interpreter summoned me to his Majesty's presence. The conversations which I held during the various interviews with which I was honoured are detailed below.

His Majesty is a young man of about thirty years of age, and of exceedingly amiable manners. He is the eldest of the four sons of the late King of Cambodia, and was long detained with his three brothers in a sort of honourable captivity at Bangkok. On the demise of his predecessor, four years ago, he was placed on the throne by the present King of Siam, who detained the younger princes in Bangkok, as a guarantee for the fidelity of their more fortunate relative. The second son was carried off in a French gunboat to Saigon when Cambodia was ceded by the Siamese, in the spring of last year. He still resides under French surveillance at that city, greatly to his Majesty's annoyance and apprehension. The two younger princes remain at Bangkok.

His Majesty converses fluently in Siamese, and very courteously offered us every facility, both for expediting our journey and for enabling us to visit whatever was of interest in the neighbourhood. He placed a house at our disposal, and invited us to dinner at his palace that evening.

We made an eight days' stay at Penompein, and were not only the frequent guests of his Majesty, but were received by the French also with the utmost civility.

His Majesty maintained a small body-guard about his person,

and he invited me to see them exercise on the morning of our departure. He has no European drill-master at present; but he told me that he was anxious to engage an Englishman for that purpose. The troops are composed of twelve companies, which serve in monthly rotation.

His Majesty stated, in course of the inspection, that he would have ordered them to assume the sumptuous uniforms reserved for State occasions, had the day been a festival; but he feared that the French officials might conceive that an emissary of the Consulate at Bangkok was receiving military honours. I gathered from this and from many other circumstances that the King's authority is completely under the control of the French, who, besides establishing their officials in the country, and sending a gunboat to cruise upon the rivers, have introduced several of their *employés* into the royal service, themselves disbursing the major portion of their salaries.

His Majesty possesses a small iron screw-steamer of English manufacture, and purchased in Hongkong. The French engineer, in charge of that vessel, receives 40 dollars a month from the Imperial Government. M. Le Foucheur, the architect of the new Palace, is paid also, as I believe, by the French, but nominally for services as an explorer of the country. His Majesty has besides two interpreters in his employ; the first one a Spaniard, and the second a Portuguese half-caste.

I failed to discover any British subjects resident at Penompein; but it is certain that numbers of Mussulmen traders repair there at intervals, bringing precious stones, Bombay silk, gold-lace, embroidered muslins, and other valuable merchandise. These wares find as ready a sale at the Court of Cambodia as they do at Bangkok; indeed, it may be worth while mentioning that, in both countries, it is from the Mussulmen traders chiefly that they obtain the rich materials composing the Court-dresses, and the sumptuous costumes of their theatrical establishments.

The King informed me, when I visited his lakhon, that many of the crowns worn by the *danseuses* were of solid gold, and taken with the jewels that studded them were worth as much as 1000*l.* a-piece. These crowns, however, are made either in France or China, according to the patterns supplied by the Cambodians.

Few English manufactures have as yet found their way into the country, the requirements of the King and his nobility being supplied almost entirely from France. In the shops, however, not only at Penompein, but also in the remotest corners of the kingdom, English needles and sewing thread, and German lucifer-matches are to be met with. Small looking-glasses are, next to these, in demand; but it is not easy to fix the country from whence they were imported. The willow-pattern plate and other

cheap specimens of English earthenware are found mingled with crockery and glasses from China, which country supplies also the brass and iron ware required for domestic uses, and the tools employed by carpenters and in the cultivation of the ground.

Chinese coolies may be hired in Penompein for about 20 cents. a day; the wages thus fall short of those paid in Bangkok, where 30 cents. per diem is the average rate. This deficiency is, however, fully compensated by the much cheaper prices of fish, rice, vegetables, and the other ordinary necessaries of life.

Formerly many junks visited both this place and Saigon, bringing coolies and other emigrants in large numbers from China; of late years they have ceased to arrive. There is, however, still a large importation of teas and silken fabrics, which, they assert, are both cheaper and superior in quality to any that may be purchased in Bangkok.

Among the domesticated animals of Cambodia is found a breed of cows of peculiar excellence; they bear a much higher price than the ordinary cattle of the country, and are run in light carriages by the nobility, who prize them for their strength and fleetness. Nowhere in Siam, Laos, or Cambodia are the people acquainted with the use of milk. Cattle are abundant and cheap, but are employed solely as beasts of burden; while goats, in that respect useless, are to be found only at Bangkok amongst the foreign community.

Mons. de Lagree, who has paid some attention to the subject, expressed an opinion that Cambodia had derived its chief wealth from its mineral resources. The relics of that empire testify at once to the denseness of the population, and to the opulence of their rulers. It is scarcely probable that, in those early days, extended maritime relations contributed much to the riches of the kingdom, and it is perhaps on these considerations that Mons. de Lagree bases his theory; I am not prepared to endorse these views, yet I think that gold, silver, antimony, and other precious metals are concealed beneath the forest-clad mountain-ranges. At the present day, however, iron forms the only mineral produce of the country. The mines are in the mountain districts of Kampon Săwai, and are the exclusive property of the King; the metal produced there is of the finest quality, but is much reduced in value by improper smelting. It is sold in rough fragments in the markets at the rate of 15 to 20 ticals a picul.

It happened on one occasion, while I was residing at Penompein, that a conflagration swept off a great portion of the Malay settlement there. I was told that such occurrences were common, and that they might often be traced to the work of some incendiary, who, having arrived in the market with a large sup-

ply of bamboos, adopted the above expedient for bringing them into demand.

I had the good fortune, during my stay in Penompein, to fall in with a Buddhist priest of high rank, who has lately been studying the inscriptions found amongst the ruins scattered over Cambodia. Having heard that I had procured copies of some of these, he called, and requested to see the same; and it is to his kindness that I am indebted for the interpretations before alluded to. This gentleman was many years resident at Bangkok, and was a companion of the King of Siam, when his Majesty was a member of the priesthood. By special request of the sovereign of Cambodia he has taken up his residence in that kingdom; and, while deeply read in the languages and archæology of the East, he possesses a gentleness and refinement in his manner which is one of the marked characteristics of those indoctrinated with the tenets of the Buddhist religion.

Having decided to proceed to Kampot, and from thence by sea to Bangkok, we took leave of his Majesty at mid-day on the 4th of April, and set out with elephants and buffalo-carts to complete our journey. There has long been a fine road from Udong to Kampot; but it is not till recently that a route has been opened by way of Penompein; the distance is about 120 miles, which it requires about five days to accomplish; and the road, which was still under construction, forms a junction with that which leads to Udong, about 15 miles above its termination. It is broad and level, passing for the most part across a sandy plain, where jungle-grass, shrubs, and stunted forest-trees abound. No important towns are met with along this route; but the villages are frequent and of considerable extent. The inhabitants are chiefly employed in the cultivation of rice and the manufacture of palm-sugar.

We had now reached the hottest period of the dry season, and had not only to travel beneath a scorching sun, but to encounter some difficulties from the scarcity of water, as the rivulets had all run dry, and only a few stagnant pools were occasionally to be met with; these sufficed, indeed, for the wants of our servants and cattle, but we had ourselves to drink sugar-palm juice and the milk of coco-nuts. We fell in daily with parties of traders conveying produce, in bullock-carts, between Kampot and Penompein, or by numerous cross-roads from the settlements in the interior; so that there is every sign that this important highway will prove of material advantage to the commerce of the country.

On the 8th of April we encountered a token of the troubles which for a long time distracted the country: a human skull,

impaled where two roads meet, marks the spot where, three years back, a band of rebels were overthrown.

A fugitive slave, named Issawa, having gathered to himself a party in Southern Cambodia, set up a claim to the throne. He had sufficient influence to secure the countenance of the Cochin Chinese, but was ultimately defeated and driven from the country. He still enjoys an opulent and influential position in his place of refuge in Cochin China, and is by many deemed the real heir of the Cambodian monarch, whom in person he closely resembles. The advanced guard of his troops being routed in this locality left two of their leaders in the hands of the enemy; their heads were at once struck off by their captors, and set up to whiten upon the field of battle.

We were by this time nearing the lofty clumps of mountains which rise in the vicinity of Kampot. These hills, mantled in impenetrable forests, save where stony precipices forbid all vegetation, are the haunt of elephants, rhinoceros, and many other wild animals.

Defiling through the passes on the evening of the 8th, we halted at the borders of a fertile plain, about 20 miles distant from the coast; thence a short march next morning conducted us to Kampot, and ended the heat and thirst of a really toilsome journey.

The town of Kampot stands in a fertile plain, under the shelter of a lofty range of mountains, and on the borders of a river ten miles distant from the sea. This stream, rising in the hills a few miles above the town, resembles an arm of the sea rather than an inland river; the tides extend their influence to its sources, and fill the broad and deep channel with clear green sea-water.

Rice and palm-sugar are raised in the surrounding plains, but it is to the pepper plantations along the banks of the river that the place owes its principal importance. These latter are wholly in the hands of the Chinese, who cultivate them with their usual industry. I am told that the vines surpass those of Singapore, but that, by culling the berries before they reach maturity, they considerably impair the quality of the pepper. Coco-nuts, betel-vines, areca-palms, and pine-apples, are grown abundantly also throughout the plantations.

During the disturbances which preceded the French invasion of Cochin China, and while the new comers were still regarded with dread, traders flocked in numbers with their produce to Kampot; the commerce there was thus forced into briskness, and European vessels often loaded at the port. But latterly these influences have ceased to operate, and Saigon has been found by many to be a more convenient market. It is not,

however, to these circumstances alone that the decay of the settlement is due; many local considerations have contributed to impair it. The seaboard swarms with pirates, and the rulers, for their own profit, secretly countenance their depredations.

The Christians look only to the authority of their priests; the Malays have chiefs of their own blood to rule them; the Chinese monopolise the market, and are too numerous and turbulent to obey any one whatever. Hence the legitimate governor, whose very title is dubious because conferred at Bangkok, is in a great measure destitute of influence, and the town consequently suffers from the divided state of its government. The whole of the commerce of the place is engrossed by the Chinese; and their extensive godowns, filled with pepper, rice, and other varieties of produce, testify to the wealth which they derive from the monopoly. But even this close body is divided within itself; and the Hainam Chinamen, by steady persecution and frequent riots, are driving the Fookheins out of the settlement. If the former party be permitted to consummate their endeavours, I think little will be wanting to complete the ruin of the port. It is worthy, however, of remark that here, as in many other Eastern markets, a Swatow Chinaman is the foremost amongst their merchants.

On the coast, 30 miles below, is the rising settlement of Kankhao. This formerly belonged to the Cambodian territory, but was seized, 40 years back, by invaders from Cochin China. Its exports are pepper, sugar, and rice, but above all the matting and gunny bags which are made extensively in the interior. The proximity of a foreign port is a further source of injury to the commerce of its neighbour.

His Majesty the King of Cambodia proposes to pay a short visit annually to this part of his dominions; and, so soon as he shall have completed his palace at Penompein, a similar residence will be erected in the vicinity of Kampot. We may hope that the occasional presence of the court will not only lend a stimulus to the traffic of the settlement, but remove in some degree the difficulties which keep it down. On being ceded by Siam to its present ruler, his Majesty appointed his brother-in-law to superintend its administration. This nobleman, however, resides permanently about the court, and little therefore is gained by the arrangement. It was formerly the custom to send tribute to Bangkok at this season of the year; but Cambodia being now freed from her allegiance to Siam, the right can no longer be enforced. The boats, however, were loaded and ready for sea when I was at Kampot, and they had been six weeks awaiting the final instructions of the King, who was apparently undecided whether to send them or no.

I cannot say for certain whether any British subjects are to be found among the Chinamen of this place; but I think that such is probable, as many of them have been educated at Hongkong or Singapore. Several, at any rate, are agents for English houses, and receive frequent consignments of their cargo.

On their complaining to me bitterly of the depredations of the pirates, I advised such of them as were concerned with British property to represent the case, in writing, to the consul at Bangkok, who would assist them in the matter. Owing to the general dread of these piratical cruisers, cardamums, silk, and other valuable produce, are no longer brought down here for exportation.

So considerable is the bar at the mouth of the river, and so shifting and uncertain are the channels across it, that ships are obliged to anchor in the roads outside, and to have their cargo conveyed to them in lighters. Even these craft, at low water, are unable to come out.

Having procured a small cargo boat, and six sailors to man it, we quitted Kampot on the 12th of April. Favouring winds brought us rapidly to Bangkok, where we landed in health and safety on the evening of the 17th.

I propose to offer a few remarks on some miscellaneous subjects which could not conveniently be introduced elsewhere.

The King of Cambodia told me that the population in his dominions might be reckoned at a low estimate to comprise 600,000 Cambodians, 10,000 Cochin Chinese, and a multitude of Chinese settlers. He could furnish, he said, no precise information of the extent of his territory, nor of the number of days in which an elephant could cross it. I ascertained, however, subsequently, that it is made up of fifty-five towns; and a list of the most important of these, with the titles of their rulers, will be found in the Appendix.

Silk forms perhaps the most important branch of commerce: a fine quality of the raw material is already exported in considerable quantities, and the country, being eminently adapted for the rearing of silk-worms, the trade is capable alike of improvement and extension.

Cambodia, however, enjoys a still greater reputation for the beauty and excellence of the langoutis and other silken fabrics which are largely manufactured in the vicinity of the capital. In the richness of their dyes, and in the elegance of their designs, they evince a striking superiority to the neighbouring nations, among whom the silk cloths of Cambodia are in considerable demand.

The proprietors of machinery in these countries are obliged, as is well known, to send from time to time to Europe for the leathern belts which they may require. Such well-dressed hides, however, are to be found in Cambodia that I know of one instance, at any rate, in which they have been applied to that purpose. The presence in Penompein of an extensive collection of timber, to be employed in the erection of the palace, afforded me an excellent opportunity of inspecting the different sorts of wood which are to be found in the country; these are not only numerous, but embrace, as I believe, many valuable varieties. I observed several descriptions of rosewood, together with a species of pine, and one or two samples also were shown to me of woods highly serviceable for resisting the effects of water. The French traders are already realising handsome profits by the exportation of these woods to Saigon, where they meet with an advantageous market. His Majesty seems to consider that the timber trade will prove a great source of wealth to his country, and he assured me that he was most anxious to induce foreigners to embark in it. On my asking whether the authorities would be likely to grant protection and assistance to any English subjects who might come to work in the forests, he promised readily to supply to such persons the permit which they would require, and to render them any further facilities that might be proper.

On a subsequent occasion, I inquired of the King what conditions would be demanded of British subjects desiring to rent or purchase land in his dominions. His Majesty replied that he could allow no foreigner to buy land in absolute ownership; but that, having first obtained his sanction, they could lease either the crown land, or that of private individuals, for terms of 30 years or less, according to agreement. He said that the river frontage about Penompein was principally his own property, and that any foreigner might rent such a portion of it as he might require, at the rate of ten salungs (6*s.* 8*d.*) per annum for every square sen of ground (16,900 square feet). His Majesty dwelt with frequency and emphasis upon the troubles that were occasioned from time to time by the overbearing proceedings of the Roman Catholic priests. It may be remembered that the cruelties practised upon the French missionaries in Cambodia and Cochin China furnished France with a plea, in the first instance, for interfering in those kingdoms. The outrages committed may be palliated to a certain degree by considering what the conduct of the priests has been ever since they set foot in the country.

Wherever a priest may have set up the Cross he makes haste to gather as many converts as possible under its shadow; his

exertions, carried on with the diligence and ability which characterise the emissaries of his Church, and seconded by the adaptability of his faith to the requirements of its worshippers, soon enable him to draw some hundreds of the population to his vicinity. Over these he in a wondrous manner gains supreme control, and claims them as subjects of the Imperial Government. Ever ambitious to extend the influence of his Church, and to magnify his personal authority, he foments petty disturbances, and is unceasingly at war with the rulers of the country: these, not unnaturally, view his aggressions with jealousy, and are neither inclined to confer on an intruder the power which he lays claim to, nor to allow that their own people have changed their nationality in embracing a different religion. At the present day these priests, both in Cambodia and Siam (where similar conduct has led to similar results) are regarded with the greater odium as they presume upon the support of the much dreaded French officials in the cases with which they are continually harassing the authorities. We can scarcely feel surprised if, when first they introduced themselves into the country, the native rulers took such measures as they deemed would most effectually put a stop to their aggressions.

Following in the footsteps of the Siamese monarch, the King of Cambodia last year issued a decree prohibiting the exportation of rice. This injunction (which was withdrawn in Bangkok in the month of August) was still in force in Cambodia when I was at Penompein. Each, however, of the Frenchmen who are engaged in trade at that place had been indulged by his Majesty with leave to continue the exportation.

The effect of the prohibition was of course to cheapen rice in Cambodia, and to raise its price at Saigon; and we may therefore conjecture what a golden harvest was being reaped by the favoured few.

In the conversations which I held with many of the Cambodian officials, I could not fail to remark the complacency with which they dwelt upon the ancient grandeur of their empire, pointing out how it had included the provinces of Siemrap and Phra-tha-bong, and had extended its frontiers beyond the city of Korat.

I believe that the French Government are already aware of the value and importance of Cambodia, and that while they entertain no design of taking it absolutely into their own possession, yet that they think both to add to their riches and to strengthen their influence in the East, by erecting it into an important monarchy under their own superintendence. With these ends in view, they are busily engaged in exploring its remoter districts, searching out practicable routes, and investigating the

navigable rivers. M. Le Foucheur was employed to conduct an expedition to the tribes of the interior; and it was not till he had brought a strong party to the wealthy city of Wieng Xan that he was forced to desist in his undertaking. Armed with new and more imperative passports he is about to journey a second time to the same regions, while a scientific commission is to be organised by M. de Lagree, and despatched next cold season, if possible, to explore the sources of the Mekong, in the heart of Southern China. It cannot therefore be denied that they are doing good in the country.

I was able, in the year 1865, to pay a visit to the city of Korat. This capital consists of a large walled town, occupying the centre of a plateau which is girt by low ranges of mountains, and by a magnificent belt of forest. It is the seat of an extensive trade, the great emporium for the silk and other products of Laos, and forms, next to Bangkok perhaps, the most important city within the Siamese dominions. It may be reached most rapidly by way of Nakhona Jok, but even on that route eight days must be expended. Carriage roads could be constructed thither with little expense or trouble, and while the delay in the communications would thus be considerably abridged, much encouragement would also be given to the traffic, which is hampered at present by the difficult nature of the approaches. But the Siamese have as yet taken no measures to bind this important outlying province more closely to themselves.

The port of Chantaboon seems to offer a natural outlet for the produce of Phra-tha-bong; from three to four days are at present required for crossing the forest-clad mountains which divide the one of these settlements from the other; and the road is so difficult that most of the merchandise is conveyed down the lake to Udong, or transported across country to Krabin. I found during my stay in Siemrap that two Frenchmen had established themselves in that district for the purpose of entering into the fish trade, and that they were anxious to buy or rent a small allotment of land.

The governor took occasion to inform me of the matter, and to ask me for my opinion thereon. I told him that, as long as his province belonged to the dominions of the King of Siam, any proposition from French subjects respecting the acquisition of land should be made through the agency of the consul at Bangkok, and that as the parties in this instance had come from Udong, I presumed that such had not been the case. He told me that I was mistaken, that reference had already been made to Bangkok, and that he had been instructed by his Government to intrust the matter to M. de Lagree for adjustment, when that gentleman should pay his intended visit to the ruins.

On the demise of his late Majesty, the second king, orders were despatched at once to the remotest provinces directing each to fell and convey to Bangkok a supply of their finest timber, to be used at the ceremony of cremation. Several thousand logs will by these means be gathered together, and it is ordered that they should be of the largest possible sizes.

Krabin, Watsana, and Aran have each to furnish two hundred, and when we consider that the two last-mentioned towns have to drag their timber with buffaloes several days' journey overland, we may conjecture that the people will find their duties laborious as well as unremunerative. While, as each year seems to open at Bangkok with some extraordinary festival, it is rare that a twelvemonth passes in which they escape this imposition.

I conclude this memorandum by remarking briefly on a matter which, at the last moment only, has presented itself to my notice. It has been stated by the late Monsieur Pallegoix * that, at a particular season of the year, a large and savoury fish called "Pla Sawai" is taken by the fishermen of the Cambodian lake; and that, being cured by them with the ashes of the palm-tree, it derives a sweet and agreeable flavour from the process. I much regret that my attention was not called to this subject till I had returned from Cambodia, and that I therefore made no enquiries about it on the spot. I subjoin, however, such information as I have since been able to gather.

There are several varieties of fish which are classed by the natives under the name of "Pla Sawai," and all of them are taken and cured in considerable numbers; of these a small portion is annually prepared by the process above alluded to, which may be described more particularly as follows:—

When the sugar-palm, which is found abundantly in the adjoining districts, has become so lofty and aged as to cease yielding sugar, the fishermen fell and burn the trunk, and steep the ashes for a few days in water; having made ready their fish by cleaning and decapitation, they soak it twelve hours in the above solution, and afterwards dry it in the sun. Fish cured in this way are reported to be exceedingly savoury, but their price considerably exceeds that of the ordinary kind, owing, as we may presume, to the difficulty in obtaining an abundance of the palm-wood. Few of them, I believe, find their way to Bangkok, as they obtain a ready market among the wealthier classes in Cochin China, to which country the bulk of them are exported. It is said also that they form acceptable presents to the noblemen and government authorities.

* 'Royaume Thai ou Siam.' Par M. Pallegoix. Paris, 1854, vol. i. chap. ii. p. 31.

APPENDIX.

A TABLE of WEIGHTS, MEASURES, CURRENCY, &c., used in CAMBODIA.

Measures of Weight.

		lbs.	
A Siamese Picul	=	$133\frac{1}{3}$	Avoirdupois.
A Siamese Pound	=	$2\frac{2}{3}$	,,
A Chinese Pound	=	$1\frac{1}{3}$	,,

Dry Measure.

A Siamese Khanan	=	$1\frac{1}{2}$ English pint.
A Siamese Bucket contains		20 Khanan.
and therefore	=	$3\frac{3}{4}$ English gallons.
A Siamese Coyan	=	375 ,,

Measures of Length.

1 Siamese Wah	=	6 feet 6 inches.
1 Siamese Sok	=	$19\frac{1}{2}$ inches.

A Siamese Kam is the breadth of a man's fist.

This last measure is used in determining the diameter of a log of timber: this is ascertained by the somewhat inaccurate process of measuring first the girth of a tree, and then counting the number of Kam, or fist-breadths, in half that circumference.

Currency.

A Siamese Tical may be calculated at
2*s.* 8*d.* sterling, and weighs 236 grains Troy.

1 Tical	contains	4 Salungs.
1 Salung	,,	2 Fuangs.
1 Fuang	,,	4 Pais.

The Siamese Months contain 29 and 30 days alternately. The first month generally commences about the middle of December, but is subject to a little variation.

A List of the Twenty-nine Chief Towns in the Kingdom of Cambodia, with the Titles of their present Rulers.

Name of Town.	Title of Governor.
Kampong Sawai.*	Phya Daixô.
,, Siam.	,, Montri Fakdi.
Muang Borai.	,, Seng Khao Fa.
,, Slīng Trong.	,, Rajah Xô.
,, Ching Phrai.	,, Phet-dai-xô.
These five towns are under the supreme jurisdiction of Somdetch Chao Fa Talahak.	

* Ten smaller towns are under the jurisdiction of this capital.

A List of Cambodian Chief Towns, &c.—continued.

Name of Town.	Title of Governor.
Muang Krang.*	Phya Phusalôk.
„ Bati.	„ Wongsa Angxit.
„ Phrai Karabat.	„ Chaijuthā.
„ Pottëmāt.	„ Utthra Thi Bŏdi.
„ Piem.	„ Rajah Săbthā.
These five towns are under the supreme jurisdiction of the Phya Umerat.	
Muang Săbung Khămoom.†	„ Orăchune.
„ Sambok.	„ Năjôk Chantakhram.
„ Simboom.	„ Montri Chonlăbot.
„ Chălông.	„ Sena Chônăbot.
„ Kunchor.	„ Montri Nĭkhôm.
These five towns are under the supreme jurisdiction of H. E. the Phya Wang.	
Muang Bah Pĕnôm.‡	„ Tharămā Daixô.
„ Phrai Weng.	„ Nara Thibŏdī.
„ Ramdooen.	„ Loo Chăkkrī.
„ Săwai Thiep.	„ Chaiju Song Khram.
„ Piem Xô.	„ Thibŏdī Song Khram.
These five towns are under the supreme jurisdiction of the Phya Kralahome.	
Muang Pôttĭsat.§	„ Songkhălôp.
„ Lapeja.	„ Săren thi bŏdī.
„ Boriboon.	„ Sena thi bŏdī.
„ Krong.	„ Rĭtthi Song Khram.
„ Kampong Sôm.	„ Thĭbet Songkhram.
These five towns are under the supreme jurisdiction of H. E. the Phya Chăkkrī.	
Muang Kampot.	„ Sena Năchīt.
This town is under the supreme jurisdiction of Phya Tssarāpinlt.	
Muang Samrong Thong.	„ Othai Thĭrāt.
This town is under the supreme jurisdiction of Phya Phīpat Tksārā.	
Muang Tăwĕk.	„ Sen Sĕnā.
This town is under the supreme jurisdiction of Phya Rāksā Tksărōr.	
Muang Penompein.	„ Rajah Maitrī.
This town is under the supreme jurisdiction of Phya Tksārā.	
Săkdā Chao Krôm.	

* Four smaller towns are under the jurisdiction of this capital.
† Four smaller towns are under the jurisdiction of this capital.
‡ Four smaller towns are under the jurisdiction of this capital.
§ Four smaller towns are under the jurisdiction of this capital.

Particulars of the Maps of Cambodia and Cochin-China executed by French Govrnment Surveyors, with information as to where they may be obtained.

Basse Cochin-Chine et Camboge. Carte Générale, Résumant l'ensemble des travaux exécutés par ordre de M. le Vice-Amiral Charmer en 1861 et M. l'Amiral Bonard en 1862. Par MM. Manen, Videlin et Heraud, Sous-Ingénieurs Hydrographes de la Marine. Publié par ordré de l'Empereur sous le Ministère de M. le Comte P. de Chasseloup-Laubat, Senateur, &c. Au Dépôt-Général de la Marine en 1863.

To be had in four sheets, probably in eight also.

XVI.—*Altitude Sections of the principal Routes between the East and West Coasts of the Province of Canterbury, New Zealand, across the Southern Alps.* By JULIUS HAAST, PH. D., F.G.S., F.L.S., &c.

No better insight into the structure of a country can be offered to the physical geographer than carefully prepared altitude sections, extending in various directions, and sufficiently numerous to afford opportunities for comparison. I thought, therefore, that in laying the accompanying sections and maps before the Society I might thereby contribute a share towards the better knowledge of the structure of this island, which has been again brought so prominently before the public, since the opening up of the mineral resources at the west coast.

When the rush to those gold-fields began to assume such dimensions that thousands of persons started overland from Otago and Canterbury, and the other neighbouring provinces, to this new Eldorado, one pass alone was known, namely, that by the Hurunui and Teramakau, over which a bridle-path, cut through the bush at the worst places, led to the west coast.

As this route was considered to be rather circuitous, several parties were sent out by the Provincial Government of Canterbury to find if possible other passes near the head-waters of the Waimakariri and Rakaia. From this resulted the discovery of Arthur Pass, near the head-water of the Waimakariri by Messrs. Arthur and George Dobson, and of the so-called North Rakaia Pass by Messrs. Browning and Griffiths. You are well aware that a pass had been discovered previously by myself near the head-waters of Lake Wanaka, leading into Open Bay, and another by the late Mr. H. Whitcombe near the glacier-sources of the Rakaia and Hokitika Rivers. In both these cases the western rivers were followed to the sea-coast; but the discovery of the latter route resulted in the death of the talented and

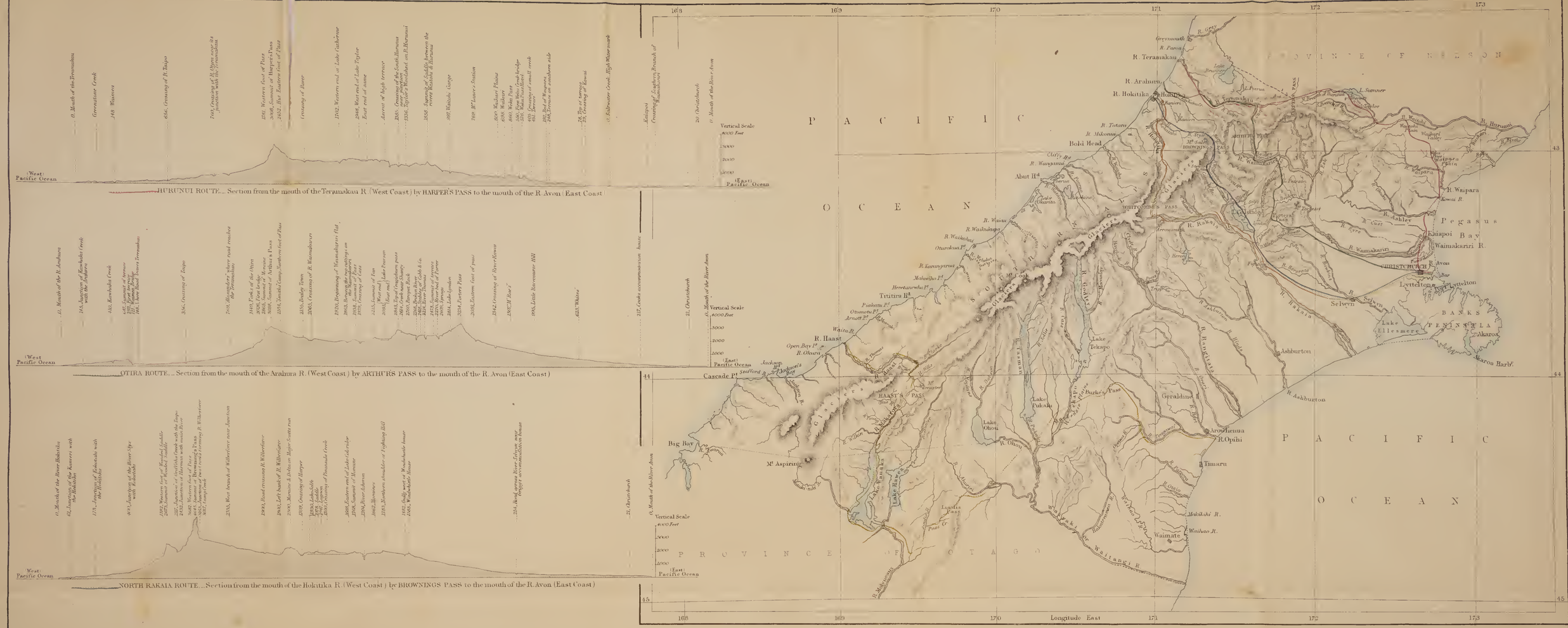
Map of the PROVINCE OF CANTERBURY (NEW ZEALAND)

Showing the Five Routes between the East & West Coasts

WITH SECTIONS OF THE ROUTES

to accompany the Paper by

Dr. J. Haast



HURUNUI ROUTE.—Section from the mouth of the Teramakau R. (West Coast) by HARPER'S PASS to the mouth of the R. Avon (East Coast)

OTIRA ROUTE.—Section from the mouth of the Arahura R. (West Coast) by ARTHUR'S PASS to the mouth of the R. Avon (East Coast)

NORTH RAKAIA ROUTE.—Section from the mouth of the Hokitika R. (West Coast) by BROWNINGS PASS to the mouth of the R. Avon (East Coast)

WHITCOMBE ROUTE.—Section from the mouth of the Hokitika R. (West Coast) by WHITCOMBE'S PASS to the mouth of the R. Avon (East Coast)

WANAKA ROUTE.—Section from the mouth of the Haast R. (West Coast) by HAAST'S PASS to the mouth of the R. Opihi (East Coast)

Scales to Map.

English Miles 10 20 30 40 50

Geographical Miles 10 20 30 40 50

Horizontal Scale to Sections 5 10 15 20 25 30 35 40 45 50 Miles

Published for the Journal of the Royal Geographical Society by Murray, Albemarle Street, London, 1865.

Edwd Weller

energetic engineer Henry Whitcombe, who was drowned at the mouth of the Teramakau, when close to a Government depôt at the River Grey.

The route by Arthur Pass was selected by the provincial engineer as it was not only the most central, but also, considering the rugged character of our Alpine ranges, because it presented less difficulties than any of the others.

Each route had, however, its advocates in the public press and in the legislative assembly, and as there was no time to make altitude sections by astronomical observations, or even by means of the spirit-level, I was instructed by the Provincial Government to prepare them by barometric observations. I already possessed the necessary material for such a purpose, which I obtained on previous journeys between the east and west coasts by Harper Pass, or the Teramakau and Hurunui rivers, and by Haast Pass, or the Makarora and Haast rivers. I started, therefore, in the spring of last year (October, 1865), furnished with a set of three good aneroid barometers by Negretti and Zambra, and other necessary instruments, and took a series of altitude observations by the Waimakariri over Arthur Pass, down the Otira and Teramakau rivers to the west coast, returning by the Hokitika River and its tributary the Styx thence across a saddle at its head, descending into the Arahura River, which brought me to Browning, or the north Rakaia Pass. After crossing this pass, still covered deeply with snow, I returned by the Wilberforce and Rakaia to Christchurch, and prepared immediately after my arrival the four altitude sections.

Since then I had an opportunity to visit also Whitcombe Pass, and collected all the necessary data for the fifth section, which I added to the others, so as to complete the five routes across the central chain in this province.

It will be observed that I have fixed upon the highest point reached by each route on crossing the central chain, as a starting point to both coasts, as by so doing not only the distance of that particular point from the east and west coasts is clearly shown, but also the comparative lengths of road to be traversed, as well as their principal characteristics compared one with another.

In the table overleaf I have given all the principal numerical statistics of these different routes, namely, their total length, and the distance from the summit of the passes to the east and the west coasts, which, for comparison, is not without interest.

The shortest route to the west coast is therefore by the Rakaia and Wilberforce, over Browning Pass, thence down the Arahura and Styx rivers to Hokitika. This is only 134 miles; whilst the longest is that which starts from the east coast, near Arowherma, and passes by Lake Wanaka, across Haast Pass, and measures

226 miles. But the routes by Arthur and Harper Passes will always be preferred by travellers, as they are seldom obstructed by snow, and are not subject to avalanches.

Routes between the East and West Coasts of the Province of Canterbury.*	Altitude of Saddle or Pass in Central Chain, in feet.	Total Length, in miles.	Length from Summit of Pass to East Coast.	Length from Summit of Pass to West Coast.
Rakaia:—				
Wilberforce route by Browning Pass†	4645	134	103½	30½
Whitcombe's route by Whitcombe Pass	4212	147½	107½	40
Waimakariri:—				
Route by Arthur Pass	3038	148½	101	47½
Hurunui:—				
Route by Harper Pass	3008	146	102	44
Wanaka:—				
Route by Haast Pass	1716	226	182	44

A glance at the different sections and the preceding table will show at once that the western slopes of the central chain are by far the steepest, and of course the shortest. Thus the section by Whitcombe Pass, which follows the beds of the most important rivers of each coast, namely, the Rakaia on the eastern, and the Hokitika on the western slopes of our Alps, gives us a clear insight into the fall of both rivers, and shows the remarkable difference between the length of their courses and their gradients. Thus, whilst the Rakaia, which is 85 miles long, has

* These distances have been measured on the map of the province, and as they pass very often over ground which has only been sketched in, it is almost needless to say that they are only fair approximations. Since these sections were constructed by me, the road by Arthur Pass, from Christchurch to the mouth of the Arahura, has been carefully levelled and measured by the Public Works Department, with the following result:—

Altitude of Pass in central chain	3013 feet.		
Total length	141 miles	78	chains.
Length from summit of Pass to east coast	94 „	6	„
Length from summit of Pass to west coast	47 „	72	„

† Two good sets of observations, obtained during my last journey on March 31, 1866, give a somewhat different result for this the highest available pass in the province, namely 4752 feet, or 105 feet higher than the altitude calculated from a single observation in November, 1865. I think that the result obtained at the latest date claims more correctness, for not only had I a double set of observations taken during fine weather at the regular hours observed at the Christchurch meteorological station, but I had also the advantage of a further check for my calculations by taking into account the observations taken at the Hokitika meteorological station, which did not exist when I travelled over this pass in the beginning of last spring.

an average fall of only 39½ feet per mile from the Ramsay Glacier its source to the sea, the Hokitika, 40 miles long, has from the Sale Glacier to the west coast a fall of 104½ feet in the mile. This difference is still more remarkable if we compare the course of the Waitaki, which is 117 miles in length from the terminal face of the great Tasman Glacier (2772 feet), and is the longest and largest river of our province, with the opposite Waiau River, which is only 12 miles from the terminal face of the Francis Joseph Glacier (708 feet). This gives 23¾ feet fall for the eastern, and 57½ feet for the western river. The latter would have of course a much greater fall, considering the close proximity of the summit of the central chain to the coast, did not the Francis Joseph Glacier descend to such a remarkably low position.

A few words of explanation to each line of section will not be superfluous, as not only will it assist the examination, but as there are many peculiar physical features in each route which these sections cannot entirely convey, and to which I draw attention.

Otira Section.—The road ascends the Canterbury plains to near the junction of the Kowai with the Waimakariri, but instead of crossing that tributary and following the main river through the gorge on the northern slopes of the Mount Torlesse range, which presents very many obstacles, the road ascends the Kowai to the junction of the two main branches, and so brings us to Porter Pass, which separates the Mount Torlesse from the Thirteen-mile-bush range. According to my altitude observations Porter Pass is higher than Arthur Pass, and thus we find that the approaches lead over higher ground than in the pass across the central chain itself.

From here to the Craigieburn Saddle we find ourselves in a tertiary basin, traversed by several tributaries of the Waimakariri, which descend from the Craigieburn range. This bleak chain of mountains, about 7000 feet high, forms the watershed between the former river and the Rakaia. Descending more than 700 feet, we reach Lake Pearson and the glacialized country of the Waimakariri, where the hills are remarkably rounded, and large open tracts, now covered by moraine accumulations or alluvium, the former bed of the huge postpliocene Waimakariri Glacier, are traversed.

The road reaches the valley of the Waimakariri after crossing the River Cass, and runs for several miles along the slopes of the outrunning spurs on its southern banks. It afterwards descends into the river-bed, and crosses a succession of fans of southern tributaries till opposite the junction of the Bealey,

where the road leads across the main river and follows the latter tributary to Arthur Pass.

When examining the Alpine passes of this province, I observed that invariably a glacier descended on each side, going in a different direction; and although near some of them the glaciers have retreated in the ranges, on both sides, several thousand feet above the present watershed, the glacier-shelves and remains of lateral moraines, with which the surrounding mountain-sides are covered, show at once that much larger glaciers existed formerly in those localities.

These extensive ice-masses have, without doubt, planed the central chain on both slopes and in opposite directions, till the ridge has been worn down to its present form. Dr. Hector made the same observation in the Otago Alps; and thus we observe again how nature, to obtain gigantic ends, uses very simple but effectual means for their accomplishment. The same remark applies equally to Arthur Pass, where remains of moraines going in opposite directions, and the course of the present streams by which the Bealey and Otira rivers are formed, give additional confirmation to such a theory.

I may here draw attention to the peculiarly slight ascent of the Bealey as compared with that on the Otira side, which is characteristic of every portion of our central chain; although in this instance we must not lose sight of the fact that the Otira is a much larger river than the Bealey, and that, consequently, the power to excavate its bed deeper was so much greater.

After a few miles, the gorge-like character of the Otira changes, and we emerge into a large valley, which has all the features peculiar to our shingle rivers, and which leads us into the large open valley of the Teramakau. Instead of following that river to the ocean, the road 24 miles above its mouth once more descends the low western slopes of the central chain, here consisting of great gold-drift, reposing without doubt on tertiary beds, and descends again by the Kawhaka Creek into the bed of the Arahura, bringing us thus to the west coast.

Harper Pass, between the head-waters of the Hurunui and Teramakau, is the second pass which from its low position and easy access recommends itself to our attention. It was the only one in use by the natives of the province, and was therefore known and traversed for many years.

An excellent dray-road brings us to the Waitohi Gorge, where a bridle-track begins and leads across the Waitohi Saddle, 1858 feet high, before we reach the valley of the Hurunui. This saddle, like that over Porter Pass on the Otira Road, could have been avoided by following the main stream from the

Hurunui Plains; but as the gorge-like character of its bed would have offered serious impediments, only to be overcome by very great outlay, this saddle was preferred as a natural road. Even now, when the bridle-track reaches the valley of the Hurunui, it leads along the precipitous sides of the southern ranges, which are remarkably bold and rugged, as far as the junction of the Southern Hurunui.

The track, when it reaches the lake regions, instead of following the main river to Lake Sumner, ascends a high shingle terrace and brings us to Lake Taylor, which lies 251 feet higher than the principal lake, and from which we descend by Lake Catherine in one of those remarkable glacier-channels into the bed of the Hurunui, a little way above its fall into Lake Sumner. This bed has, like all our rivers above the Alpine lakes, a straight valley to its source, and in which it meanders in many branches. The road follows this river-bed, beautifully wooded on both sides, to the foot of the pass, and an easy ascent of about 300 feet brings us to the summit. Like Arthur Pass, it is on both approaches and on the mountain sides covered with sub-alpine vegetation, whilst the saddle proper is formed by swampy ground with small waterholes at different levels and with outlets in opposite directions. The descent into the bed of the Teramakan is far more rapid than the ascent by the waters of the Hurunui.

At the same time the source-branches are far more important, and form, after having descended 1500 feet in a few miles, a river much larger than the Hurunui on the opposite side. This western valley has a straight course, and can, even without a road and when the water is not high, be followed with horses to the west coast by swimming across at a few localities in the gorges below the junction of the Waimea where the river breaks through the low tertiary ranges.

The North-Rakaia Route, by Browning Pass, does not, with the exception of the pass itself, present any serious difficulties. The road follows the Canterbury Plains to the moraine accumulations beginning near the gorge of the Rakaia, now mostly concealed under alluvial beds, to Fighting Hill, when it follows an old course of the Rakaia, across several moraines.

Reaching the terraces of the Acheron, the road descends several hundred feet to the bed of that tributary of the Rakaia, and ascends again considerably till it reaches the moraines lying above Lake Coleridge. A descent of about 100 feet brings us to the south-eastern corner of that fine sheet of water, now the head of the lake. In my section I have followed the old road by the Lake Selfe depression, running between low iceworn

hills across several small tributaries of Lake Coleridge, and after having reached the former lake followed its outlet to the Harper, a tributary of the Rakaia.

Crossing the Harper a few miles above its junction with the Wilberforce, the road again ascends, crosses the numerous fans which unite the isolated ice-worn Scott hills to the main range, and descends above those *roches moutonnées* into the bed of the Wilberforce. Here the road crosses the stream, following afterwards along the base of the Cascade Range over good ground to the junction of the Stewart River, which is the principal branch of the Wilberforce.

Having crossed that river (Stewart) we travel by a good track to the southern base of Browning Pass, which rises about 1500 feet above the river. I may here observe that I was obliged to exaggerate the vertical scale in the sections, as it would have been impossible to show the details of these routes otherwise.

The steep slopes forming Browning Pass look, therefore, in this section almost vertical, and form a striking feature when compared with the other passes, the slopes of which are of a much easier gradient.

Having ascended the southern face of Browning Pass, passed along the small isolated lake situated on its summit, and crossed the ice-worn hills of which the summit is formed, we descend by the steep northern slopes into the bed of the Arahura, which, above the junction of the Harman, is so open that the traveller can advance rapidly by crossing and re-crossing; but immediately above that junction and for several miles below the river is confined between perpendicular cliffs, often several hundred feet high, which with little interruption continue till the river reaches the west-coast plains. The track, therefore, after passing the Harman Stream, leads along the eastern shoulder of Mount Sale instead of following the Arahura, and crosses a low saddle (the so-called Wooded Saddle), which brings us to the headwaters of the River Styx, one of the source-branches of the Hokitika. This stream has a remarkably straight course, and brings us into the west-coast plains.

Whitcombe Pass is another interesting pass. The road to it, so far as the south-eastern end of Lake Coleridge, is the same as the Wilberforce Road: here it diverges and follows the bank of the Rakaia to above its junction with the Wilberforce.

Crossing the Wilberforce near its junction with the Rakaia proper, the road leads along the slopes of Mount Algidas to the junction of the Whitcombe, the river-bed being too swampy to follow. Having crossed the Mathias at its junction, the road continues for about seven miles over a large flat on the northern

side of the river, where the stream sets against its banks, which are covered with dense vegetation and rise nearly perpendicularly above the water for a considerable altitude. The traveller has, therefore, to cross to the southern side, and to follow a grassy flat along the Arrowsmith range.

Having arrived at the point which projects most into the river-bed from that range, the last crossing is effected; and after travelling for a few miles over shingle-beds, we reach the junction of the Whitcombe Pass Stream with the Rakaia. From here the remarkable opening through the Southern Alps is clearly defined. Following then the valley of this true mountain torrent over huge blocks of rocks and through dense Alpine vegetation, and crossing several large streams rushing down the steep mountains from several glaciers, we reach, after having ascended a *débris* wall stretching across the valley, the summit of the pass, when the interesting phenomenon of two glaciers going in different directions is still visible.

On the Sale Glacier the main source of the River Hokitika reaches still across the valley; and if the Martin's Glacier, the main source of the Whitcombe Pass Stream, would only advance a few hundred yards, the moraines of both, and perhaps the ice-masses, would meet on the summit of the pass, although descending in different directions. The descent towards the west coast is more rapid, particularly for the first 400 to 500 feet.

For about ten miles on the western side the road follows the straight shingle valley of the river, which afterwards enters the wooded west-coast ranges, forming a succession of gorges, with rapids and waterfalls.

Jacob Louper, the surviving companion of the late Mr. H. Whitcombe, Government surveyor, has given us a vivid description of this portion of the route in a report to the Government. It is partly unknown to me, as I ascended the Hokitika River for only 30 miles from the sea-coast.

Haast Pass.—There remains only that pass to which my name has been given, situated near the head of Lake Wanaka, and which lies so remarkably low, considering the altitude of the Alpine ranges on both sides. On the section I have shown the road I travelled by, which is that generally used by travellers in this province. By it two passes of greater elevation than the principal pass across the central chain have to be crossed, namely, Burke Pass, leading from the headwaters of the Opihi into the Mackenzie Plains, or upper valley of the Waitaki, and thence by Lindis Pass into the valley of the Molyneux. Both could, of course, be avoided by following along the valley of that

latter important river; but as my object was principally to show the comparative value of each route to the province of Canterbury, I could not abandon the direct road leading to Lake Wanaka. My section shows the road which crosses these two passes leading thence to Lake Wanaka, and along the shores of that lake to Messrs. Stewart and Kinrus's station. From thence we proceed by water to the head of the lake, as there is much difficulty in travelling with horses along the shores of the upper portion of the lake, the country being very rough in many places. Thence to Haast Pass the road follows the valley of the Makarora and its tributaries by a very easy gradient, and then falls more rapidly for about 10 miles to the junction of the Burke with the Haast, when again the natural fall of the valley to the sea offers a remarkably fine highway between the two coasts.

In former publications which I had the honour to lay before the Society, I have described this road at length, so I need give no more details about it now.

On the Value of Barometric Observations, taken on a rapid Journey, for calculating Altitudes.

Since the altitude sections and the comparative diagrams were prepared, and the foregoing remarks were written, I have, through the courtesy of Mr. E. Dobson, the provincial engineer, obtained possession of the results, obtained by means of the spirit-level, for the whole Otira or Arthur Pass Road, which are personally of the greatest interest to me, besides possessing a high intrinsic value. Not only is there a very perfect altitude section of that important road thus obtained, uniting the agricultural and pastoral districts of the eastern side with the western goldfields, but it gives me also a very welcome opportunity to check my own barometric observations, calculated six months previously.

These altitudes, obtained by the Public Works Department, may, of course, be relied upon, as they have been twice checked, and the difference was found to be only a few inches.

Mr. Dobson has kindly allowed me to publish these spirit-level altitudes, which I do the more readily, as it gives me an opportunity to compare them in the following table with my own, obtained with three good aneroid barometers, and to which I beg to draw the attention of geographers:—

TABLE of ALTITUDES of the Road by ARTHUR PASS, across the Province of Canterbury, New Zealand, as obtained by the following observers.

Places of Observations.	Dr. T. Haast's Barometric Altitudes, Nov. 18, 1865.	Spirit Level Altitudes of Public Works Department, April, May, June, July, 1866.
	feet.	feet.
Cook's Accommodation House	217	228·00
White's Accommodation House	623	631·23
Southern base of Little Racecourse Hill	995	979·39
McRae's Accommodation House (formerly Willis's)	1327	1273·54
Southern bank of River Kowai	1387	1424·47
Centre of bed of River Kowai	1342	1393·62
Riddle's Accommodation House, foot of Porter Pass	2091	2060·00
Summit of Porter Pass	3234	3097·00
Lake Lyndon (high-water line)	2814	2743·00
Springs, sources of River Porter	2609	2535·00
River bed of Porter, where road crosses	2270	2266·00
Summit of Terrace on its western side	2473	2491·00
Bed of River Thomas	2214	2197·6
Accommodation House near Mr. Eny's Station* (stable of Cobb and Co.)	2418	2374·00
Top of Terrace of Broken River, eastern side	2413	2390·00
Bed of Broken River	2168	2094·00
Top of Terrace on its western side	2386	2350·00
Road near summit of Parapet Rock	2760	2750·00
Bed of small creek near Shanty	2614	2583·00
Top of Craigieburn Saddle	2843†	2619·00
Lake Pearson	2095	2085·00
Road crossing River Cass	1879	1874·00
Saddle between Cass and Waimakariri (Goldney Saddle)	1938	1929·00
Bed of Waimakariri, between the two cuttings	1863	1808·00
Crossing of Waimakariri	2065	2044·00
Bealey Township (Police reserve)	2155	2130·00
Southern foot of Arthur Pass (Smith's Camp)	2534	2497·00
Arthur Pass (highest summit)	3038	3013·00
Southern foot of moraine	2697	2666·00
Summit of moraine	2865	2825·00
River bed of Otira, first bridge	2026	2035·00
Junction of two branches of Otira near the stock-yard	1449	1450·00
Bed of Teramakau near junction of the Otira, where the road joins the main river	769	731·00
Western bank of River Taipo, near junction of Teramakau	356	355·00
Waimea, where the road leaves the Teramakau	148	168·00
Foot of Terrace	121	159·00
Summit of highest Terrace	647	652·00
McClintock's store near Kawhaka Creek	410	422·00
Junction of Kawhaka with Arahura	145	104·00

* In my report this position was erroneously set down at 2548 feet above the sea, which is the true altitude of Mr. Eny's homestead, which lies close to the accommodation house.

† Without doubt an error in the readings, as the observations on both sides taken an hour before and afterwards, agree very closely with the spirit-level.

It will be seen from these tables that my altitudes were in general a little too high. To produce this the difference in the state of the atmosphere at the meteorological station near the sea-coast, and at the same time on or near the summit of the passes in the interior, may have had some influence on the readings of my instruments, not to speak of minor index errors.

The table shows thus once more convincingly that although mathematical correctness cannot be claimed for altitudes calculated from barometric observations, they are nevertheless sufficiently accurate for all practical purposes. And every observer must rejoice that even single observations, when carefully taken, possess more intrinsic value than is generally allowed to them.

I am afraid that these few observations will not be of sufficient interest to warrant my laying them before the Society, which receives such valuable and instructive papers from all parts of the world; but my desire to make geographers acquainted with some of the results obtained lately by me when enquiring into the physical geography of some portion of this beautiful island will, I trust, be sufficient excuse for my having done so.

Christchurch, December 27, 1866.

XVII.—*On the Subterranean Supply of Water in Beloochistan and the Hill Districts of Western Sind.* By J. W. BARNS, Esq., C.E., F.R.G.S., late of H.M. Bombay Public Works Department.

HAVING resided the greater portion of the period since 1845 in Sind, where, from the scarcity of rain, water, and above all running water, is the "summum bonum" of the land, and where its economical application to irrigational purposes formed the nature of my duties on the Staff of Colonel (then Captain) Fife, our great hydraulic engineer, I had long entertained the idea that subterranean water existed in certain localities in the hills, capable of overflowing through artesian borings if they were made, and in 1865-6 I determined, after a critical examination of the hills bordering Sind, to give this mode of obtaining water a trial.

The place selected for my labours was distant about 8 miles north-east of Kurrachee, and I had the satisfaction after some weeks' labour of piercing the first water-bearing stratum, when the water rushed up and overflowed the surface, continuing, without intermission, to flow to this day.

The water is of a temperature of 85°, and as the stratum in which it is found is a saline aluminous shale, it is, from per-

colation through the same, slightly brackish, but at the same time useful for irrigation; and although not such as would be preferred for household purposes, myself and the men engaged on this work used no other for twelve months.

Most of the large springs in the hills proceed from the nummulitic formation which forms the back-bone of the Hala range, and are brackish. Springs frequently occur in the selfsame locality as the more deep-seated springs from the nummulitic, but in a much more recent formation. I apprehend that wherever the superior aluminous shales yield, as in the case of my borings, a continuous flow of water, we may reasonably calculate on a larger and purer yield if the borings are continued to the lower tertiary strata.

Although I have succeeded, as mentioned, in getting a continuous flow of water, and that at a high level, it must not be inferred that this is the only proof of its existence. Within 4 miles of these borings on either side are natural springs, viz., two on the north-west at Muggur Pur, aggregating a discharge of 180,000 gallons in the twenty-four hours, with a temperature of 126° and 98° respectively, and another south-west at Wapda discharging one-fifth of that quantity.

In another part of the hills within 40 miles of Kurrachee there are tracts of many square miles in extent covered with travertine, containing recent fresh-water shells, and from 10 to 12 inches in thickness; thus showing indisputably the flow of spring-water charged with bicarbonate of lime for a very long period. At Pur Ghazee, near Schwan, is a remarkable spring, discharging one and a half million gallons per day, over a precipice 270 feet high. Indeed the whole of this portion of the hills, for a breadth of 100 miles from Kurrachee to Khelat and the Boolan Pass,* contains such a vast number of springs and small streams that it is impossible to detail them. Many of these are used up in irrigation, and a still greater number, after flowing from one to ten miles, disappear in the sand, or flow off into cavities of the limestone formation, through which they pass, to appear again, doubtless, in places at a lower level, where faults bring the water to the surface.

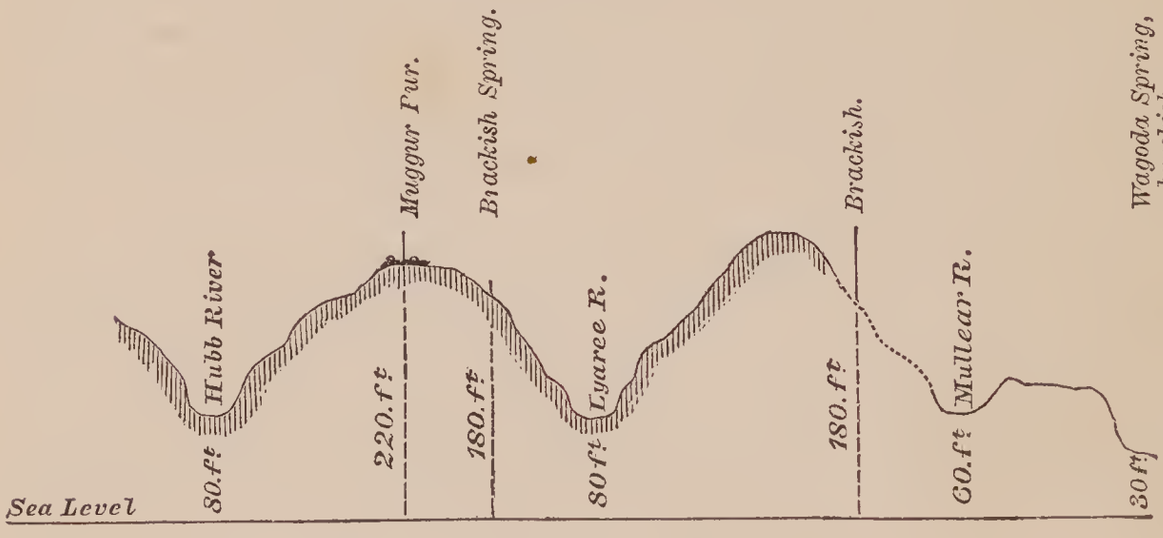
In proof that these springs, and consequently the subterranean water generally, derive their head of water, and therefore their first source, from some spot far removed from their immediate locality, I should mention that most of them at their point of issue over the surface of the ground are from 60 to 300 feet above the valleys in their own immediate parallel. Thus, for instance, the spring at Muggur Pur† flows to an elevation of

* Vide Masson's 'Tour in Affghanistan.'

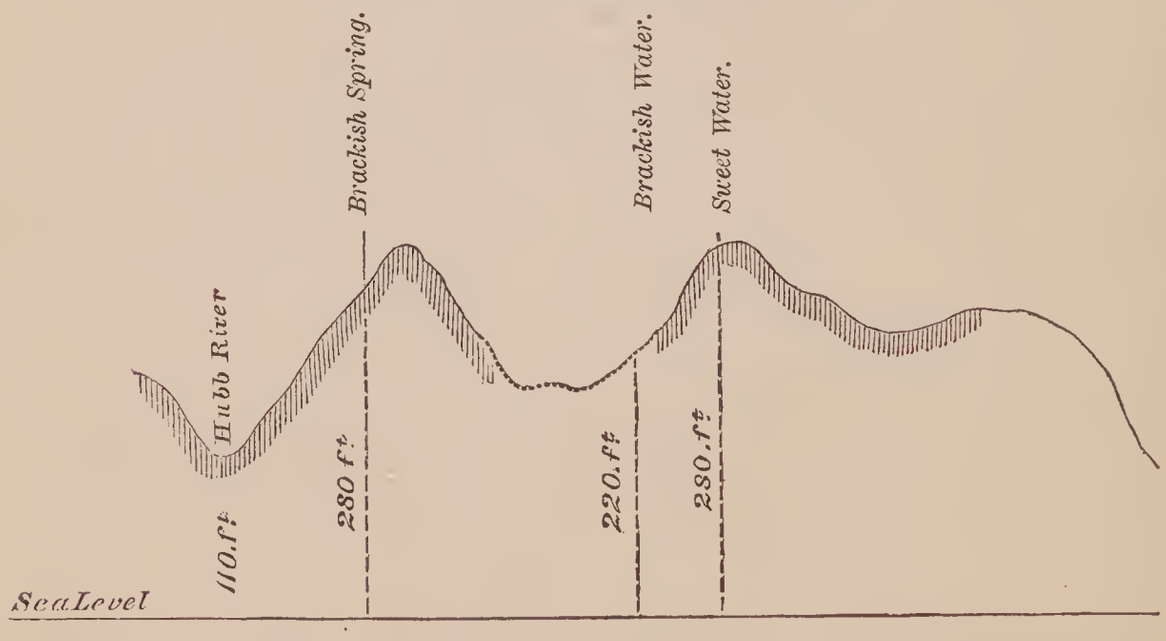
† Nine miles from Kurrachee.

220 feet above sea-level, whereas the water, in the two valleys between which the hill giving rise to this spring is situated, is not more than 80 feet. Again, at a section across the country east and west, 25 miles north of Kurrachee, the subterranean water issues at 280 feet above sea-level, whilst the Hubb River in the adjoining valley stands at 110 feet.

Section at Muggur Pur.



Section 25 miles north of Kurrachee.



Many other sections would give somewhat similar results.

With this evidence of the presence of subterranean water we are bound not to stop in our inquiries, and hence arises the question, where is the source?

In dealing with this question we start with the absolute certainty that wherever water is found inland, whether in the shape of springs or rivulets, it has but one origin, namely, the supply from the clouds in the form of rain and snow.

We are in the habit, because some large portion of these zones just beyond the Tropics contains vast deserts, and has no rivers

draining towards the ocean, that there is literally no rainfall; but it is a mistake; even Sind, which is spoken of often as being destitute of rain, gauged a rainfall of 40 inches in some parts within three months last summer, and averages I believe four inches per annum. But if we glance at a map of Asia, we observe between the eastern borders of Persia and the western boundary of the Sind and Punjaub valleys a tract of country 330,000 square miles in extent, with an enormous area of mountain land from 3000 to 12,000 feet above sea-level, and, as Pottinger remarks, "subject to heavy falls of snow; showery in the months of September and October, and the whole of the cold season (viz., from November to March inclusive), more or less so; so that four or five days seldom pass without either sleet or rain. Even Mekran and Lus," he goes on to state, "have their wet season in February and March, and also June, July, and part of August."

I have no doubt that these remarks refer especially to the mountainous tracts of Affghanistan and Beloochistan, and not to the desert portions of Seistan to the west and south-west.

I have not obtained access to any meteorological registers of this region, and therefore endeavour to arrive at an approximation of the average rainfall by other means. For the purposes of this paper I think I can show sufficient *à priori* evidence of considerable rainfall in the mountainous parts of these countries, and that consequently there must, as is the case in every country in the world under similar circumstances, be a considerable subterraneous supply available in that tract lying to the southward of the 30th degree of latitude.

As regards the subterranean supply in the hills from Kurrachee north to Khelat, I am of opinion that, if no other accessory were available, the proximity of Khelat to Kurrachee, viz., 200 miles, its position with regard to the slope of the country, which is north and south, and its being the southern terminus of an elevated range of mountains, from 6000 to 12,000 feet above sea-level, culminating in the great lateral range of the Hindoo Kush, running east and west (portions of which are covered with perpetual snow), I am of opinion that this range alone, on the elevated parts of which snow lies for many parts of the year, must be an enormous source of subterranean water.

Turning to the map, we observe all the rainfall of the region comprised within a line from Khelat through Ghuznee on the east, the 30th degree of latitude on the south, the 34th degree of latitude on the north, and the longitude of 62° on the west, culminating to one point, viz., the Lake Hamoon, or, as it is known to geographers, the "Aria Palus," a hydrographical basin equal in extent to that of the great River Euphrates, viz.,

108,000 geographical miles, like those of the Helmund and its tributaries, are lost in a sea of marshes.

Most travellers agree in assigning the dimensions of this lake during the period of the melting of the snows to be 70 miles long by 15 to 20 miles in breadth; or, in round numbers, say 1000 square miles, whilst Pottinger leads us to understand that its ordinary dimensions are 30 by 12, or say 350 square miles. This, I believe, will, until it shall have been further investigated, enable us to roughly estimate by analogy the average rainfall of this watershed.

In Sind, viz., the interior, I have found ponds to lose one inch in depth per diem from August to January, and lakes in the Thurr Desert to lose half an inch per diem until they decrease so much in depth as to receive their equivalent in evaporation from springs.

In Calcutta (a humid climate) 15 feet per annum is the amount proved by registry, being nearly half an inch per diem; whilst at Greenwich 5 feet is allowed; in Bombay ·26 of an inch is the amount of daily evaporation during the dry months; and although it is generally supposed that evaporation is considerably less over large areas than small ones, still these registries refer to evaporation pure and simple, and do not include the portion due to percolation. This lake is described as being nowhere more than 3 to 4 feet in depth, and covered with reeds. Captain Conolly says that for four months in the year, during the summer solstice, evaporation must be excessive, from the absorption by the scorching rays prevalent in that season; indeed when, as Major Rawlinson informs us, the summer heat in a bungalow is 120°, and the temperature of running water at Bushire 90°, we must assume for evaporation, vegetation, and percolation, during the four summer months, when we know no dew can possibly fall, at least one inch per diem, and for the other eight months let us assume the loss from those causes not to exceed a quarter of an inch per diem; it will then be found that, although this allows for a discharge from all the rivers combined of 1,613,333 * cubic feet per minute during the four months when snow is melting, and 141,166 † cubic feet per minute during the other eight months (the discharge of the Euphrates being estimated at 14,214,466 cubic feet, or nearly nine times the estimated discharge of the Helmund and the other rivers flowing into Lake Hamoon) it only represents 1·31 inch, or a little over an average of one inch of rainfall per annum.

Now we have a perfect right to assume that this quantity of 1·31

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* Equal to 40 such rivers as the Thames, at Staines, in the summer flow.

† Equal to $3\frac{1}{2}$ such rivers as the Thames in summer flow.

inch per annum is at least only one-third of the average rainfall, which would give us a total average rainfall of 4 inches per annum over the area of this geographical basin; and as we know that in every country in the world a portion of the rainfall (estimated variously from one-third to one-twelfth) percolates and is absorbed by the soil and the permeable strata, and that the whole of this basin is elevated much above the sea-level, and that according to tradition the Helmund formerly discharged itself into the Indian Ocean, there is room for a strong inference in my opinion that a vast body of water is available, in the whole of that region between the 30th parallel of latitude and the sea. It is recorded by navigators that large springs of fresh water burst up through the sea in the neighbourhood of Cape Ormuz; the same thing has been observed off Cape Monge; and I doubt not if attention were called thereto the same phenomenon would be observed in other parts of the coast. The formation of this part is undoubtedly tertiary, and the stratification of the hills where not horizontal generally inclines either to the eastward or southward. It will be recollected that under somewhat similar conditions the French engineers a few years since have brought a perennial flow of water in many parts of the Algerian Desert.

I regret that I have felt it necessary, in order to attempt to convey my ideas and information on this very interesting subject, to have been led into such a lengthy paper, and should it have no better effect than to excite inquiry and attention to this subject, I shall consider the labour I have bestowed amply repaid.

XVIII.—*Notes on the Pangong Lake District of Ladakh, from a Journal made during a Survey in* 1863. By Capt. H. H. Godwin-Austen, F.R.G.S., Topographical Survey.

Read, December 10, 1866.

To the north of the Indus, from its junction with the Dras River, lies a high range of mountains which separate the Indus drainage from that of the Shayok or Nùbra River. The axis and great mass of this range is granitic; on the west this extends to within a very short distance of the river, while at Pitùk below Leh, the granitic hill on which that large and well-known monastery stands abuts on the Indus itself, and thence towards the east for a considerable distance it holds the same position. The great mass of coarse sand-stones, red clays, grits, and conglomerates, seen on the right bank of the Indus, west of Pitùk, are now seen on the left or south bank, thence to the

east in the direction of Stock and Himis. On the above granite range are several passes leading into the Shayok Valley, all of great elevation; and on the direct road from Leh to the Pangong Lake are two, viz., the "Chang La," and the "Kay La," both high, being respectively 17,470 and 18,250 feet above the level of the sea.

The ascent to the first is gradual from the village of Tagar in the Chimray Valley, which there divides into two large ravines; the western branch leading to the Wari La, while the eastern runs up to the two passes above mentioned. On the 15th July, when our party crossed the Chang La, the snow that had fallen in the early part of the month still lay; we all suffered more or less from the effects of the rarified air. On the return journey *viâ* the Kay La, 800 feet higher, scarcely a man suffered from this cause: we had then been living for some time at a high altitude, which very probably had not a little to say to our immunity from the fatigue and headache engendered at high elevations. The mountains on the northern side are perfectly bare, a little grass growing only along the bottom of the valley, which had a steady easy slope the whole way to Dùrgo, and the scenery is not remarkable save for its huge scale and bleakness. Before reaching the village of Dùrgo, one emerges out of the narrow valley upon the level surface of one of those large accumulations of alluvial sands and shingle that are seen along the large valleys of these mountains. The powerful force that accumulated the materials that form them is now extinct, and the circumstances attending their formation, and, more wonderful, their subsequent denudation, are as yet but little understood. At this spot the vast scouring process was well exemplified: the level of the plateau on which I stood could be traced across the valley in and out of its numerous ravines in a perfectly horizontal line of a different colour, where very small portions of the alluvium still adhered to the slopes and precipices; and I do not think I am exaggerating when I state that its thickness at the junction of the streams below Dùrgo was over 1500 to 2000 feet. The whole valley is very open—low cliffs of alluvial sands and clays can be traced the whole distance on both sides —and it is self-evident that at no very distant period this presented a long reach of water; an after sojourn on the Pangong fully confirmed this.

From Dùrgo to Tanksè is a distance of 8 miles, and the road quite level. The stream is considerable, and contains a small kind of fish, of which I saw numbers at the Dùrgo bridge. Mountains rise to a great height on either side; and at the southern end of the valley, towering above Tanksè, is a fine snowy peak, called Tanksè No. 1. The village of this name is

large, and a very fair area under cultivation. Many of the houses are built close under a large mass of conglomerate, the stones firmly cemented in it, and to this cause it must owe its present existence at the mouth of the narrow gorge towards the Pangong, out of which the soft beds have been washed away. The main stream comes from the southward, and drains the Lùng Yùghma Valley and the mountains on the north of the Indus River. It is joined at Tanksè by the small stream that drains the valley up which the road to the Pangong runs; this is at first rather shut in and confined by the mountains that rise in cliffs on either hand, but where it takes the more direct easterly direction it opens out considerably; high cliffs of the alluvial shingly deposits again occur, forming a belt at foot of mountains of the northern side, about 300 feet high, and some 400 yards distant from the stream. The physical appearance of the whole length of this valley showed unmistakable signs of its having at one period been the bed of a lake. I am induced to think for a part of that time it was continuous with the portion below Tanksè, and that the mass of alluvium above Dùrgo was contemporary with that above Mùglib. Above the two lakes, Tragùmè Bur Tso, there is no longer any water in the bed of the stream save at intervals here and there, where it breaks out in a small rill to lose itself in the loose gravel a few yards lower down. Over distances of more than a mile it is deep white sand, the collection of which is a good deal due to the wind. Down to this sand the talus from the mountains extends, tending every year to increase the height of level. At the low pass of Surtokh, whence one obtains the first view of the Pangong Lake, this action is nowhere so well seen; this ridge of Surtokh forms the watershed across the natural exit for the waters of the great lake, and it is entirely formed by the loose shingle brought down a somewhat large lateral ravine from the snowy peaks to the south. This bed of talus actually divides, part to the eastward, part to the west, so that the waters may in some years blow one way, in others another. If the supply of water to the Pangong Lake were equal to what it must formerly have been, when the glaciers were double their present size, the continual flow of water would soon carry off these talus accumulations from the mountains above Surtokh; there being now no force in action for this purpose, the snows of winter and the waters of the side ravines tend to raise the main valley-level every year.

The Pangong Tso (lake) is about 2½ miles distant from the low ridge of the Surtokh La, or, more properly speaking, its natural bar or bund, but the level of the old lake-bed extends up to within a very short distance of the pass. A rise of 150

feet in the waters of the present lake would find them again an exit down the valley to Tanksè. A trigonometrical station lies close to the water's edge; its height has been determined trigonometrically to be 13,931 feet above the sea. From this mark-stone a fine view of the first long reach of this elevated and interesting piece of water is obtained. Its colour is of an intense blue, the water as clear as crystal, but far too saline to be drinkable; there was quite a salt-water feel in the air as the wind blew off it. Knobs and peaks were seen for many a mile along the spurs that descended from the ranges bounding the northern shores. From the height at which one stood, these all appeared comparatively low, only on the highest lay a few small patches of snow, thence to their bases was one succession of shades of yellows, purples, reds, and browns, the invariable colouring of Tibet, not a scrap of green.

The Pangong Hill Survey Station is a short easy pull of some 1000 feet above the lake, obtaining a most commanding view, up and down it, across the spurs of north bank and high up among the snowy peaks to the south, where small glaciers just show above the masses of the old moraines, which extend down to the level of the lake. Little streams flow down these steep inclines, like silver threads, from the ends of these glaciers, to finally lose themselves in the silt and sands that skirt the edge of the lake, for only the most considerable of these streams find an exit in its waters. Such is the one that flows through the little oasis of Mun; it owes its size to the streams from three glaciers, uniting some distance above the village. The silt brought down by these has formed a miniature delta, or arm of shallow water running out into the lake. In the course of a conversation with the coolies and men of Mun, I learnt that, some three or four marches on, the lake narrowed to a mere stream which was fordable, and that it was not necessary to follow the northern shore. On the 22nd July my march lay over the sandy, stony plain, skirting the shore of the Pangong, crossing two or three ravines, where sections are well displayed of former and higher levels of its waters, in sands interstratified with an angular rubble like that distributed over the present surface. At about 8 miles from Mun, the straggling village of Mèruk is passed on the right hand, and the last on the lake—Karkpèt—is 3 miles further. The level ground between the shores and the foot of the mountains increases much in breadth as one proceeds east, and the stream from Chushal gives from a distance no signs of its proximity; and I was rather surprised on coming suddenly upon a fine body of water, flowing with a quiet current through a narrow belt of green grass, some 10 feet below the surface of the plain. Finding plenty of wood and a

nice green sheltered spot under the bank, I pitched camp by the side of it.

The extent of level ground here is considerable, quite 10 square miles, dotted over in the vicinity of the stream with a few low bushes, and over the rest grows a scanty coarse grass in tufts. Towards the shore of the lake rise two very conspicuous isolated low rocky knobs, a mile apart, and between these is the confluence of the Chushal stream and the Pangong Tso. The next morning I walked across and ascended the most eastern eminence, having the strange sounding name of Tuggù Nuggù. This had formerly been a fortified post; the level space at the top was enclosed by a low stone wall, while a detached outwork had been built on the low spur that ran out on the east side: none of my coolies, who were all from this district of Pangong, could give any account of it, as to when or by whom it had been built. It must be comparatively an ancient work; still, considering how soon events are forgotten by such men, its age may be only 150 to 200 years. It was a lowering morning, and, before I had finished my survey work from this position, it came on to rain hard, which we sat out on the top. The shower passed off up the lake; and it had a fine effect on the view in that direction, with the lines of falling rain over the expanse of water and the misty mountains bounding its sides. The state of the plain, which, when dry, is covered with a hard incrustation of lime and a salt that crackles under the feet, had now by the wet been turned into a sticky loam, that adhered to the boots in huge lumps and remained like a cement upon everything it came in contact with. One and a half mile beyond Tuggù Nuggù low spurs abutt upon the lake in cliffs of 150 to 200 feet high, and the way leads along the narrow shore at their foot, with very deep water washing the bank. Passing one large bay we rounded a low narrow point of beach only to find the existence of another bay, called Phùrsook; this forms the boundary between the Kashmir Rajah's territory and the Chinese district of Rudokh.

Phùrsook formed a circular, sheltered little lake in itself. A narrow strait only connects it with the water outside. It was evidently of great depth in places where the hills came down in cliffs upon it; a narrow beach ran along the foot of these, formed of talus cemented by lime. The bay formed a perfect harbour, in which a line-of-battle ship might have floated, and sailed in and out of it. Were this lake in a less elevated region, or on a line of trade, how useful would the water-communication prove up and down the extent of its two long portions. The first or lower lake is 40 miles in length, the second 33; giving a total of 73 miles, exclusive of the upper long portion beyond Tso

Nyak, which is quite 18 miles. The first thing that must strike any one of observation, is the evidence of this lake having been formerly fresh for its entire length. Myriads of dead fresh-water shells now strew the shore. These, thrown up by the waves in a long white ridge, lie so thick in some of the bays, they can be taken up in handfuls. They are principally of *Lymnæa* and *Planorbis;* but, though I searched diligently, I never found a large bivalve—only one very small *Pisidium*, that I found inside one of the specimens of *Lymnæa:* nor did I ever find a living specimen, which I had hoped to do in the upper lakes, where the water was very slightly brackish. When these shells existed, the former lake must have had quite a different aspect from its present one; and in it must have grown, for the sustenance of these molluscs, beds of water-plants, while its banks would have been fringed probably with grass and rushes.

There is a point in the history of the Pangong Lake on which may be based a good deal of theory as to its older aspect: it is the former size and extent of its waters. On every side unmistakable traces that the level was much above the present one are seen in the lines of old beaches and in the beds of sand, containing the fossil remains of fresh-water shells, interstratified with beds of angular *débris*, which, as I mentioned before, are to be seen in the little dry ravines that cut through the plain.

These sections prove great changes, and also, I think, that the lake existed prior to, certainly during the latter part of, the great glacial period in the Himalayas. Whether the scooping out of the depression in which its waters lie is due to glacial action in the first instance, when this high region was, as is most probable, deeply overlaid by ice and snow, is a hazardous question, and one highly problematical. From the alternation of the beds of *débris* and finer deposits, we can infer that there have been milder and moister seasons than at present exist, back to colder and drier: during the first, beds would have been deposited by the increased transporting power that would have carried the materials further out into the lake, while at the same time the level of the waters would naturally have been much higher. Its waters must then generally have held much silt and mud in suspension to form the shell-beds already mentioned. At the present day no deposit of any kind is taking place, save perhaps near the débouchement of the Chushal and the extreme western tributaries.

A closer inspection, with some levelling, would, I think, somewhat clear up the mystery attached to the huge masses of alluvial deposits seen in the valleys of all the great rivers of the western Himalayas, from the Chang Chúngmo and Leh to Skardo, in the Valley of Kurgyl and Valley of Dras, and on both the

Thelum and Chandrabagha (Chenab) rivers. Give a greater rainfall to the Pangong district, and a lower snow-line, now above 20,000 feet, and the ravines would be seen with fine running streams in them, and, allowing time, would cut through the barrier at the Surtokh La, and eventually down through the whole length of the alluvial deposits in this lake-basin; the large valley and its tributaries then drained would resemble most closely on either side the sand, shingle, and conglomerate deposits now seen at Tanksè and on the above-named rivers. These deposits at Ote would be somewhat higher, and would cover a greater area from the junction of the great tributary there. As a proof that the waters of the Pangong Lake in former times have fallen below its present level, I may state that on a long point of land in the little Bay of Phùrsook, in deep, very clear water, I looked down upon a terrace 10 feet below the surface, which terminated in a cliff, where the stratification of the sand and clay could be well seen; the bottom was not visible beyond this, and it was too far out to enable me, with my present means, to sound the depth. The only deduction to make from such comparatively recent changes is, that the level of its waters has been alternating with moist and dry periods of time, the slow process of which may be even now going on almost imperceptibly to man. The water of the Pangong, depending, as it does, mainly on the winter snow, I ask, may not the snowfall in this part of the Himalayas be much less now than formerly, and the country passing through a period of diminishing falls? Slow as such changes may be, they are by no means improbable or impossible. From the mountain-spurs having approached so close to the broad bed of the Kyam go Tragger, the absence of water, and it having also taken a bend, we had been led to imagine its course here ended; but this we were both of us much surprised to find was not the case, for we now beheld ahead of us an enormous gravel-covered valley, stretching away to the foot of mountains at least 18 miles further to the eastward. This open valley had the most peculiar aspect of any I had yet seen, but partook in its dry gravelly bed a good deal of the nature of those valleys I had seen between Pal and the Kiùng Gang La; its elevation was about 16,400 feet, and its breadth in widest part about 2 miles, the ridge of hills bounding it to north, lay to about 4 to 5 miles off, but were only 3000 feet above it, and the spurs came with a very gradual fall towards the valley. On the south a very low ridge of about 500 feet—in places not more than 300—separated this valley-plain from another broad one of a like character, the ravines of which ran up into the hills in wide beds, from 200 to 300 yards in breadth. Several broad lateral drainage-plains

also formed a junction with the one we were in, from the northern line of hills that run parallel with it.

In the foregoing pages reference has been made to the great accumulations of boulders, gravels (more or less angular), clays, and sands, near Tanksè, and in the Chang Chùngmo; it is necessary to add a few words regarding the cause I assign to their formation. This I think clearly glacial. Proofs are not wanting that in ages past the valleys of the Himalaya contained glaciers of enormous length and thickness, the only types of which are to be seen in those now filling the valleys of the Karakoram, far north in Baltistan. About half-way between the villages of the Kungun and Gond, lying on the Sind River (a tributary of the Jhelum), Kashmir, and at the village of Gond itself, marks of glacial action are unmistakable in the deep grooves or striæ cut in the hard metamorphic slates, at a height of 150 to 200 feet above the present level of the river. This point is 20 miles in a direct line from the head of the valley, where at present some very small glaciers exist. How much further this glacier extended towards the plain of the Kashmir Valley it is impossible to say, but at the débouchement, 10 miles below, thick beds of *débris* are to be seen. The Sind River is still of very considerable size, and glacial accumulations are very soon swept away, as may be seen in the now existing large glaciers below their terminal cliffs. Taking 5500 feet as the lowest limit of its extension, every valley in the vicinity of a range equal in mean altitude to the mountains north of Kashmir, must have been once the bed of these moving rivers of ice. The indication of glacier extension are also seen on the north of the Zogi La, between the present glacier of Muchoi and Pundras, at 10 miles from the pass. It is my belief that the Dras plain was once buried in ice, and that this region presented much the same appearance that the neighbourhood of the Mustakh does now. The imagination can hardly conceive the enormous magnitude that glaciers like those in the Karakoram must have once attained, and that they extended into the Skardo Valley on the Indus; 70 to 80 miles is by no means improbable. Smaller ones from the ridge to the south we know did; for near Kepchùn, a fine mass of moraine protrudes into the plain nearly a quarter of a mile, having very large angular blocks on its surface. Moreover, this moraine must have been formed after the valley around Skardo had assumed somewhat its present configuration, for this basin has at some period been filled up with beds of lacustrine deposit, gravels, and conglomerates, to a height that overtops the present isolated rock rising above the town, the coarser beds being the highest in the series; but it is quite natural to suppose that on a milder climate succeeding,

these larger alluvial deposits would be the first to be removed by the extinction of glaciers further down the valley, while the cold was yet intense enough to preserve those around and above Skardo. Though the vast accumulations of *detritus* in the Skardo basin were, I conceive, due to the glaciers from the high ranges both to the north and south of the Indus near Basho, which glaciers must have extended close down to and dammed up the river, it does not follow, as some might be led to suppose, that the whole mass of such a mighty barrier should be formed of ice. It was the *débris* of moraines that would have composed this, from its continued accumulation in so narrow a gorge as the Indus there presents. These exuviæ piled up would have raised the bed of the gorge, and the bed of the lateral valley as well, also elevating the active cause, viz., the glacier itself; and in course of time the whole valley-level would have been brought up to the height of the great deposits around Skardo. Innumerable other instances can be seen of ice-action throughout the Kashmir territory. I will instance near the Fotu La, on road to Leh, a spot now far removed from such causes in action. Even in the valley of the Jhelum, below Bara Mùla, the effects of a glacial period can be seen. That glaciers, filling lateral ravines, have extended across the main valleys at some period of their existence is most probable; and in nearly every case where gravel deposits are seen, some side ravine below, having its sources high up, can be pointed out, whose glacier has formed a temporary stoppage to the main river into which it ran; and such effects are still in progress in the highest ranges of the mighty Himalayas. When glaciers extended down to 5000 feet, what must have been the appearance of the Upper Shayok Indus and Chang Chùngmo, where 12,000 to 13,000 is the lowest level of the country? Contemplation of such a condition renders the formation of lakes and the accumulations of detrital matter a natural sequence, very easy to imagine. Further, when such powerful forces of ice and water were in action, their results would have extended far down the main-drainage lines, and are to be sought for at the débouchement of such rivers as the Indus, the Sutlej, Ganges, &c.; and I believe that the more recent accumulations of immense boulder-beds composed of rocks from the inner ranges, such as may be seen in the Noon Nuddee, Deyrah Dhoon, and other places along the base of the Himalayas, may owe their existence to a glacial period in these mountains.

In the lower lake there is not a vestige of any sort or kind of plant. The beautifully blue clear water washes a bank of sand and pebbles, the latter perfectly free from algæ. This is not the case beyond Ote, where the water is much less salt;

there the stones under water are extremely slippery, and covered with vegetable growth. At this part, also, patches of a coarse water-weed are also seen here and there along the shore, but not growing luxuriantly, and evidently making a struggle for existence. The waters of the western end are far more salt than those of that near Ote, noticeable even to the taste, but it is not until the stream that connects the two portions is fairly entered that it is by any means drinkable; thence for the whole distance eastward we used to take water, save when we had the luck to find a spring of really fresh. By looking out carefully we discovered springs in three places flowing out from under the bank, and in one spot these springs were bubbling up for some distance out into the lake, rendering the water quite fresh around; and it was quite a pleasure to see the poor yâks, who carried our baggage, take a fill of it, when for three days they had drank nothing but salt water. A curious feature of the Pangong is the almost entire absence of streams whose waters find an exit in it, considering the great area that some of them drain; for, with the exception of the few glacial rills and the Chushal stream on its south shore, and the stream at the extreme west end, from the Marse Mik La, there are none. The northern shore is particularly dry; not a single rill joins it for its entire distance until arriving at "Pal," on the upper lake; and the same may be said of the southern shore, from the Chushal River to Ote, and for many miles beyond. Many of the ravines have their sources at a considerable distance, but near the lake have broad dry beds from 200 to 300, and up to 500 yards in breadth of rubble and sands. I may instance the very large lateral ravine at Ote, the longest branch of which runs back into the snowy mountains of Chang Chùngmo for a distance of 40 miles, draining altogether an area of nearly 400 square miles. The silt, which in former times has been carried down from the above area, has formed the plain of Ote, the broad barrier to what would otherwise be a continuous long reach of water. This was no doubt the old configuration of the lake, for a rise of some 12 feet would cover the greater part of the Ote plain even now. In nearly all the higher ravines water is plentiful, and glaciers of the second order are seen, but the streams are all sopped up in the broad bed of the main valley, which acts like a perfect sponge: the stream breaks out occasionally here and there only to hide itself a few hundred yards down; the last water seen being above the fort of "Lanakh-khur," but it nowhere is seen to flow into the lake, being lost in the sands of the plain.

The western end of the Pangong Tso lies, as near as possible, in latitude 34° and longitude 78′ 30°, thence its direction is due

south-east to latitude 33° 40′; it then takes a bend easterly, and follows that latitude as far as Noh, in longitude 79° 50′. The mountains to the north-west of the first long reach are of no great apparent elevation. In July there was very little snow to be seen, and only on the very highest portion, or the main range which, nevertheless, is from 18,000 to 19,500 feet high; the highest peaks being 20,000; but the level of the lake being 13,931 feet above the sea, detracts considerably from their altitude. The terminal knobs of the spurs from the above range lie close on the edge of the lake, rising to the height of 600 to 1500 feet, generally terminating precipitously; and the lake, I should imagine, is excessively deep in such places. It would be a most interesting scientific enquiry to sound, with the aid of some portable kind of boat, the depth of this lake. To the south-west a high range runs parallel to the lake, some of the peaks on which attain an altitude of 21,500 feet; this range terminates in a peak above, and to the east-south-east of Tanksè, which is 20,003 feet.

The above fine line of mountains, covered as they are with perpetual snow, and their ravines terminating above in small glaciers, form a fine boundary to this valley on the south. The southern watershed follows the lake very closely as far as Ote. It there extends further south, and between that place and Pal several very large lateral ravines descend into it, all with the usual broad, dry, gravelly beds; the largest of these are the Algrong, Tengun, Kiam-Surpo loombas, or valleys. On the northern shore, beyond the very large valley of Chang-Burmah, which finds its exit at the Ote plain, there is another, the Dal-Loomba, that drains the considerable tract of 150 square miles; the silt carried down from this has narrowed the lake very much, forming a low point jutting out into it, and has contracted the waters to a quarter of a mile in breadth. Altogether the mean breadth of the second lake, "Tso Nyak," or "Middle Lake," is much less than the first or true "Pangong." Wherever a tributary ravine joins the shore there is grass, scanty, as a rule, and of a very coarse kind. At Ote it is much richer, especially in the vicinity of the stream that unites the two lakes. On both banks of the second lake wood is found in plenty, growing luxuriantly in places. At Algrong and Numkum it formed a scrubby jungle; but on the northern shore, at Silùng, it was met with no more, and the only fuel was a stunted plant, which throws out a good deal of woody root, and is found all over the country; and I never found a scarcity of it even up to 18,000 feet in the Chang Chùngmo, save where the ravines were very rocky. Descending from the small ridge between Paljùng and Pal, the extensive plain near the latter

comes in view, bounded by low spurs on every side, save the east, where a conspicuous peak rears its head; a small stream winds its way through the eastern side of the "Maidan," and joins the lake, being the only one on the northern shore that does so.

Three and a half miles beyond Pal the second lake ends, and a small stream is found flowing into it through half-a-mile of sandy flat ground, beyond which is another lake, called Tso Rum, having a length of about four miles; after crossing again some flat ground, Lake Tso Nyak (the second) is reached, connected, as before described, with Tso Rum below. Near the northern shore of this last is situated the small village of Noh, a short distance up a tributary from the north. This place I much wished to visit, but could not manage to accomplish it. On the northern shore of Tso Nyak, at intervals, a ridge of sand and earth runs parallel to the line of beach; at first I attributed this to the action of waves, but observing the large proportions of these banks in some situations, and at last seeing the ridge quite 6 feet high, and, moreover, that the bank had been fairly turned up, as if with a gigantic plough, I was puzzled to account for such an appearance; and on questioning the guides, then learnt that during winter, when the lake is frozen over hard, the water naturally accumulates under the ice, and, flowing westward, can find no exit. When the pressure becomes too great it tears up the frozen earth on the shore, and, liberated, flows over the surface of the ice. I give a slight sketch of a section through one of these banks, showing the old surface grass still growing on the perpendicular face of the upheaved ground, which, of course, is on the inland side. On measuring this I found it an inch or two over 6 feet. I noticed, also, that the banks were higher and better developed on the western curves of the bays. During summer, evaporation, no doubt, carries off a great amount of the surplus water that drains into it; but in the winter this must cease, and, with its upper casing of ice, the water, to free itself, tears and roots up the banks in the curious manner above detailed. During the whole time I spent on the shores of the Pangong, the only animal I saw was the kyang, or wild ass of Thibet; a few couple of these were grazing on the grassy maidans of the northern shore. Of the birds, geese were plentiful in the stream between the first and second lakes, and I saw many young broods. The Brahmini goose, teal, a red-headed diver with white body, and a very black plumaged duck, made up the water-birds.

There was a great scarcity of smaller birds; a sand-piper and wag-tail were occasionally seen on the shore. The large fish-

eagle was plentiful at Ote, attracted there by the fish which are seen for the first time in the slightly brackish water, flowing out of the upper lake; this lake is full of them,—they much resemble the tench in shape and colour, only somewhat longer in the body, and are covered with slime like those fish. I had fortunately brought a rod, and had near Num Kum, in deep water under the rocks, a very good afternoon's sport, catching some five-and-twenty; they ran about a pound in weight—the largest I caught being about 4 lbs. These fish formed a welcome addition to our food as long as we remained on the lake. I supplied my old Bhut Moonshie and some of the guard with hooks and lines. They became fierce fishermen, and brought in good bags. It is a fine sight to see the lake during a storm, when a good strong wind is blowing down a long extent of its surface, and dashing the waves, which rise to a considerable height, against the hard rocky shore. I had the fortune to see its surface in this state one morning; and sitting down, watched the waves rolling in, and Pangong waves brought up thoughts of beaches in old England. Though the country is so barren, the lake has its beauties in the varied tints of surrounding hills and mountains, and the rich deep blue of its waters, becoming quite of an emerald-green colour as they shallow near the shore. During the summer months the lake is quite deserted, and we did not fall in with a soul the whole distance up to Pal, or we might not have got so far. At that time of year the flocks of shawl-wool goats, sheep, and yâks, are grazed in the higher valleys on the young rich grass that springs up in some places after the snow has left the ground. During winter they are brought down to the level "maidans" near the lake, and Ote, I was told, becomes dotted with black "Champa" encampments. Snow, they say, never lies long at Ote, though the lake freezes all over very thick, and the degree of cold must be very considerable. The Champas or Changpas, who spend the winter on the lake at Ote, come from both Noh and Rudok. The said plain is a disputed piece of ground, the men of the Pangong district claim it; though, judging by the site of an old fort standing on a low rock on the north-western side of the plain, I should say it undoubtedly belongs to the Shassan authorities, by whom it was built years ago: proximity of Leh and greater part of the Thanadar there, places it in the Kashmir Rajah's territory. Walls of stone and earth are built up as a protection for the tents against the wind, and, to render them still snugger, I observed that the interior floor of their huts had been dug down to a depth of 3 feet, which must make them warm abodes.

I found the summer winds of this country cold enough.

What the winters are like I can well imagine. The amount of comfort in a tent, on the edge of a frozen sheet of water stretching for miles, must be a very minus quantity. During the whole period of my sojourn there in August, 1863, the weather, with a few solitary fine days, was miserably cold,—nothing but cloud, sleet, and rain. I may have seen it under disadvantageous circumstances, and I trust at times it does enjoy a little warmth and brightness. On the 1st of August we reached Paljung, and in the afternoon of that day came in sight of the first natives we had seen, viz., three men driving some yâks in our direction. They saw us at the same time, and turned and bolted: we followed, but failed to overtake them, it being about two miles to the point they had rounded. They had disappeared up some lateral ravine out of sight; our approach was, therefore, known to the Rudok men. It rained in torrents during the night. Camp was pitched at Paljung, where a long broad nulla-bed came down to the lake, and a low long promontory ran from the hills on the north out into it.

Our road next day, on towards Pal, lay over this, it being a very long round to follow the shore under the cliffs. From the low pass the broad dull green plain of Pal was seen, and on its western side we discovered the black tents of a small Tartar camp. As our approach was now certainly known to these people, we bent our steps there. Three men came out to meet us, and turned out very mild individuals, one being a Lhama or priest. Their dogs, of the large Tibetan breed, were much more noisy and furious at the intrusion of strangers, and were not to be reconciled until long after the tents were put up. These Champahas informed me that one of their number was about to ride into Noh at once, to give the news of our arrival and have it thence sent on to Rudok. I instantly set my Bhut Moonshie down to write a letter to the governor of the place requesting that he would raise no difficulty to my paying a visit to the place, and see its monasteries. The next two days I remained at Pal, for the hills were buried in dense cloud, and a good deal of rain fell, so that I was unable to proceed with my survey work in an eastern direction; on the third day the Zimskang of Rudok rode in with some twenty followers, and pitched his tents on the other bank of the little stream, and came over at once to see me. He was a native at Lhassa, a short, stout, jovial fellow, and brought a letter from the Governor of Rudok, and a white scarf, together with a present of two damuns (bricks) of tea, and some sheep and goats for my men. The letter was then read by the Moonshie, and was to the effect that it was not in his power to give me leave to visit Rudok, as he had strict orders from his superiors in Lhassa to

prevent foreigners crossing the frontier, and that it would eventually be known if he permitted it. He added that he could not use force to prevent my further progress; but he trusted I would not lose him his appointment by so doing, and that I would accept the presents as a sign of friendship. Having received orders not to bring on any collision with the Chinese officials, I had to give up the idea of seeing Rudok; but I held out for one more march towards the place, and gained my point, but not before showing some anger at their absurd wishes.

The Zimskang again came over, after my dinner, about 9 o'clock at night, to beg I would not proceed any further; but I said they must abide by their first agreement. The afternoon of that day I was enabled to ascend the limestone mountain, east of camp, and fix my true position: the range around Rudok, and the eastern end of the lake, were also again visible, and I was enabled to get intersections with other rays. The 5th broke, fortunately, clear and bright, so I started early along the shore of the lake in direction of Noh, my friend the Zimskang stuck to me like a leech, the whole day, with a few of his men; and a curiously dressed rabble they were, with their enormous flat mushroom-shaped hats, and all mounted on little shaggy, but sturdy ponies. They were all very jolly and amiable. I made no secret of my work, and showed and explained the map of the lake to him, which he thoroughly understood. I have found the people of Thibet far in advance of those of Hindustan as regards drawings, and what they are meant to represent. At a small hill called Tobo Nokpo—whence I had promised to return the previous day—I fulfilled my agreement, evidently to the great pleasure of the Zimskang, who was now more pleasant than ever, and thanked me with many salaams. On the 6th August my tents were struck to leave Pal, and the Rudok men did the same. I was invited over to their tents previous to starting, to partake of a parting cup of salted tea, churned with butter, which is always kept simmering on the fire; it is by no means a bad beverage when made with good fresh butter. I gave him a few presents and we parted. At the eastern end of the Pangong the hills somewhat decrease in altitude, the highest lying to the north of Noh. Looking in a direction due east from the higher points I ascended, the country appeared flat but undulating, and I observed in the far distance two or three pieces of water; these may turn out to be connected with Pangong Tso, probably bounded by steep sides, which were not discernible at twenty miles, they may extend for some distance; the breadth of this high region was considerable, and extended up to a snowy

range that rose suddenly on the south. The more level surface was not bounded by any mountains, and was seen stretching to the horizon.

The morning we left Pal was raw, cold, and cloudy; the road lay north-westerly for some distance over the dead level plain, that showed distinctly it had once been covered by water, for dead fresh-water shells are seen for some way; we then rose from it over a long, very gradual slope of some three miles, which at last contracted into a ravine, bounded with very low hills. The little camp of Champas continued their march with us, and had we been one day later coming into Pal we should have missed them altogether, and gone straight into Noh without meeting a soul. Nearly all their worldly goods were carried on sheep, only a few articles carried on the ponies they rode. The women drove the former, and, in fact, did more in the packing, unpacking, and pitching of the tents, than their lords and masters; after which they were sent on to the hill-side to collect the roots of a low shrub, having a scent like lavender. One of the Champa girls was very nice-looking, and wore a peculiar head-dress which is not seen on the Ladakh side. The usual narrow fillet of cloth worn by the Ladakh women was treble the usual width, and covered with torquoise and silver ornaments; near the attachment at the forehead was a bar of silver set with small torquoises, pendant from which, so as to lie on the forehead, were a number of silver coins attached by short strings of coral beads; the effect was very good. I had the young lady brought over to my tent, where she sat for her portrait, and was delighted at the drawing made of her.

The encamping ground was called Tobo Ruberu, and was a level piece of green grass, with several good streams of water flowing across, for, curious enough, the higher ravines of the country have plenty of water, but these are all absorbed a few miles down in the sand and gravel of the broad water-way. The valley was here high, broad, and nearly level; the mountains were of no great elevation above it, not more than 3000 feet, the lower slopes falling gradually from them into the valley, which was patched with furze of stunted growth and plenty of good grass. The morning of the 7th broke clear, sunny, and bright, with a fresh breeze; we started early, and gradually ascended the valley to the pass in our front, called the Dingo La, 16,270 feet. On the top the ground was nearly level, expanding into wide, open ground to the north; on the left rose a hill, about 1000 feet, which I determined to ascend to obtain a view over the hills and country around. Walking a short distance up this, a small tarn was seen in the centre of the level ground north of the pass, which had once evidently

extended over the greater part of the area. Scattered plants of rhubarb are here seen, but very tough and acid. The rocks were all of limestone formation, with a strike nearly east and west. I found no fossils; but it resembled in appearance the Palæozoic rocks of Dras, &c. I obtained from the peak a fine view, but could see no more of the eastern end of the Pangong near Noh, on account of a dense haze in that direction. I was much disappointed, and could only fix a peak or two looming up through the mist. My own camp and the Tartars had gone on, and I quickly followed them down the valley. This was very characteristic of these regions; spreading out into a broad, gravelly plain, on the left side of which was a sharply-defined scarp, showing its general level had been uniform. This plain forms the head of one of the branches of the Dal Loomba.

We parted with our Champa friends at a place called Chulpan, where they encamped to graze their goats and sheep for a few days, while we proceeded on along the side of the hills of the right bank, rising gradually to a low pass called Pa Luen, and descending on the other side to another tributary of the Dal Loomba, which at this spot branched into three broad arms that penetrated into the mountains on the north for some eight miles. The longest of these valleys had a direction north-west, and up this our road to the Chang Chùngmo ran: no water was here to be found, and it was not until we had proceeded another two miles that water was found in the bed of the ravine. Where we halted fuel grew in plenty—the yellow-flowered Tibetan furze, differing slightly from the European in not being quite so thorny. The valley was still broad, but the hill-sides descended into it with steeper slope; it was here called Drukker. When on the Sa Lam, a horseman was seen riding down the valley from the north, who joined us; he had come from an encampment up the valley, and said he was sent to escort us on to the pass ahead. Our movements were therefore well known, though we should not have supposed a human being to have been within miles; but the Champas were evidently on the watch, and espied us the moment we topped the pass of Sa Lam. Between camp and the Deenjor La the valley bore the same character, save that the broad gravelly bed was covered with a luxuriant growth of furze, this swarmed with hares, which got up in all directions, and I had some good shooting. The Deenjor La was reached about 10 o'clock; I found it by boiling-point thermometer to be 17,465. The rise was gentle the whole way, and fell in like manner into the valley on the north. As I came up to the usual pile of stones on the crest, two fine *Avis ammon* came round a spur to the right, at about 200 yards' distance. I managed to get a little

nearer, but missed them. A fine mass of hill rose to the south. Appearing easy and near, I sent the camp on to the stream below, and commenced the ascent; this was a good deal steeper and further than I had anticipated, proving to be 20,240 feet high.

The labour was rewarded, for from the summit I obtained a splendid view, and did a large amount of work; massive snow-beds still covered the top, and the wind was bitterly cold. The mountains to the south of the Pangong were well seen, with the great snowy range near the Indus beyond Rudok; and I still longed to go on in that direction. Up the mountains to the south and west, there was a fine view—of a country, bleak, naked, stony, and inhospitable. Only in a tributary of the great Chang Burma Loomba—whence was a way to Ote—was anything green; a little grass and furze there skirted the stream. Work being finished we were soon down again. It was a bitter cold evening, but the camp was in as sheltered a spot as we could find, and there was some good grass here for the yâks. The valley below camp took the usual configuration, and ran towards north-west, with a bed about one-fourth of a mile broad; at about three miles we reached the confluence of a large valley from the north, and up this I determined to proceed, and thence ascend to Kiepsang trigonometrical station. Several kiangs were here seen, and up the valley numerous Tibetan antelope. After marching up the gravelly wide hill for five miles—whose main tributary turned to the east and ended in an extensive elevated plain, on the surface of which lay some large snow-beds—we were rather at a loss to find water. I took the eastern branch, while the yâks and servants proceeded up the western (the Nertsè Loomba), towards a patch of green grass, where I thought water would be found, and this proved to be the case. From this the staff on the top of Kiepsang was visible, and a very delightful little pull up it looked. I followed the eastern branch to a low pass, which overlooked a narrow gorge that terminated a short way down on another high level plain. There was no track of any kind to be seen here, and my guides told me that the country on beyond was grazed over by a nomad tribe, called Kirghis, who did not own allegiance to the Rudok authorities, that they were great thieves and robbers, and occasionally came to Tanksè to exchange their wool for grain, of which they had none. These are the people who wander over the plains, thence to Ilchi, and into a terra incognita on the east.

It was not until late that I got back to camp, going to bed with the prospect of a stiff ascent next day. I was up and off very early: at this hour it was very cold, the water of the little stream frozen hard, and the backs of the yâks were quite

white with the frost. I took the line of a ravine which led up to the ridge east of the Kiepsang staff; the ascent was most fatiguing over the loose angular *débris* that filled the steep bed of the ravine, whose waters were frozen into waterfalls of ice. In this ravine we put up from under a rock a hare so benumbed with cold it could not run, and it was knocked over with a stick by one of the coolies, to his great delight. On reaching the bridge there was a long pull up to the pole, but the view recompensed all the labour to legs and lungs; the ascent was 3200 feet, the peak being 20,035, while the camp below was about 16,800. Bleak wastes of hill and wide dry drainage-courses met the eye to the north-east, backed by some high mountains, whose loftier peaks were covered with snow, and threw down some glaciers. To the south the great tributary of the Pangong, the Mipal Valley, could be followed for many miles; high, rugged, angular mountains bounded it on every side. It was very very cold, and I could scarcely do my work or hold the pencil; the clouds were gathering up fast, and before I left the peak sleet had begun to fall. I got under the lee of the ridge for breakfast, and made a brew of tea in the boiling-point thermometer-pot, of which I gave a cup all round to my men, and then descended on the western side into the valley below; by skirting the hill-sides, down into the ravines, and over spurs, we reached by evening the Kiùng Gang La, 17,259 feet, on the boundary of the Kashmir and Rudok territory.

At this pass are stationed, throughout the summer months, a guard of a few Rudok men; these we now met, and they were chaffed by my Tanksè coolies for thus being taken in rear; but they were very good-humoured, and said they were now off for their homes, and left that day with their ponies, black tent, tea-churn, &c. We saw a good many antelopes during the day. The next morning we proceeded down the ravine to the north, which was grassy for some way. The coolies, who had gone on with the breakfast things, came upon seven wild yâks, who went off down the valley, and were not seen again; they were, I believe, very wary: great numbers are to be seen later in the season, when they are driven out of their higher haunts by snow into these lower grazing grounds, which were covered with their traces. They occupy this part of the country from about the end of October until March, the larger number roaming away into the high plains on the north, though some remain throughout the year in the neighbourhood of Pangong, but I do not think are met with south of it. Numbers of hares were seen, and I bagged a couple for the pot.

Near this place I met Mr. Turnor, an English traveller, who, when I told him whither I was going, said he would accompany

me. He had been searching for the pass by which M. Schlagintweit had crossed towards Ilchí; but the natives with him (for he could not speak Hindustani) had brought him in this direction, quite a contrary point of the compass. The valley ahead of us appeared to end at about six miles distant, and thus it had been sketched in on the rough reconnoissance I had; so the next morning it was determined to leave the camp where it stood, and go on ourselves to the main ridge of the valley and return by evening. Plenty of woody-rooted wild lavender, or rather a stunted plant with the like scent, grew around, but grass was very scanty—only in two or three spots was found barely sufficient for the yâks. A few large patches of snow still lay on the ground; these (for the hill-sides were now quite bare of it) were the remains of deep drifts formed by the winter winds. I could not spare time to proceed any farther: I had much work to finish in the rear, and some high points to ascend, which the early snowfalls would shut up for the season. I much longed to explore, but could not do so. Mr. Turnor went on beyond for two days, and gave me afterwards a sketch of the ground. It appeared that for some ten miles further the open valley turned sharp south, and disclosed a long piece of water like the Pangong, but the mountains shut out the end of it: nor did he ever get so far as the edge, to tell me whether it was fresh or salt; so this may be, for all we know, another rival to the great Pangong Tso. Turnor saw six or seven miles of its waters, which he described as having a breadth nearly equal to that of the above lake.

Fine agates and cornelian are to be found in a small ravine, at the spot where the long southern spur from Chamkang H. S. abuts on the Kyamgo Traggar. I made a short ascent here, in order to obtain an extensive view over the country to the south-east. This presented the appearance of large, broad, level valleys, that might almost come under the designation of plains, the undulating ridges that divided them being of so little elevation. On the 15th August I encamped close to the hot springs of Kyam. These rise at the foot of the hills on the left bank; the alluvial plateau on the edge of which they are situated extends for about half a mile to the river, and ends in a low cliff. The water rises in several spots, covering a distance of about 150 yards long. The spring on the extreme west side is largest, and temperature the highest. The ground about is wet and swampy. From the north-west a large tributary here joined the Chang Chùngmo River, adding so much to the depth of its waters that it was a matter of difficulty crossing at the two fords below Kyam. The valley now lessened much in breadth, but the alluvial deposits were still well developed, and were cut into

a series of steps by the gradual falling of the lake, or the diminished waters of the river, or a drier climate commencing.

In the Gedmure Loomba was a green expanse of grass, with a rather severe ascent to a grazing spot called Boomzi; from this a high broad plateau extended to the pass, the line of watershed being so broad that it was difficult to assign its exact position. The high wide valley parted north and south, in first direction to the Ororotze La, 18,050 feet, only used by shepherds when taking flocks to graze in the lower courses of the Chang Chùngmo River.

I had now finished the whole of my work, and went on as far as Muglib, thence to Tangsè, where I paid my coolies: the men behaved very well; never had I any occasion to be put out by them. I returned to the Indus Valley over the mountains by the way of Kay La, 18,256 feet. The Kay Loomba River is fringed with grass and bushes for a considerable distance up, and at a height of 16,300 feet flows out of a lake about 400 to 500 yards long, of a very deep clear water. It owes its origin to a large landslip from the left side of the ravine, by which cause a very considerable portion of the hill-side has moved forward and been disrupted. The rock is granitoid, the same as the Chang La, and forms the main axis of the mountain-chain between the Indus and Shayok. From the lake to the pass the scenery was as wild as could be; near its source the ravine turned south, and was nearly level for some distance, ending amid a mass of scattered rocks, débris, and snow; large beds of which still filled the ravines and lay in patches on the summit of the ridge. The wind blew with great violence from the W.S.W., on reaching the pass, with that cutting, piercing, unsparing manner it does at these elevations. Behind the shelter of the rocks I boiled the thermometers, and then descended into the valley below.

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